KNOWLEDGE ACQUISITION FROM L2 SPECIALIST TEXTS

YASEMİN KIRKGÖZ

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF ASTON IN BIRMINGHAM

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ABSTRACT

This research aims to investigate knowledge acquisition and concept formation in the domain of economics and business studies through a foreign language, English, from the very initial to the very final stage of development in the context of Higher Education in Turkey. It traces both the processes as well as the product of acquisition in order to provide a detailed picture of how knowledge acquisition occurs. It aims to explore ways in which the acquisition process can be facilitated and promoted while prospective students of the Department of Economics and Business Administration receive a language training programme, following the completion of which they will join their academic community which offers part of its courses through the English language.

The study draws upon (some) theories of mental representation of knowledge, such as schema, frame and script. The concept of discourse community with its characteristics is investigated; enculturation of prospective students to acquire knowledge of their domain through L2 is explored, and the crucial role of the constructivist theory in relation to knowledge acquisition is highlighted.

The present study was conducted through a process of enculturation taking place partly at the language centre of Çukurova University and partly at the target discourse community. The data utilised for initiating knowledge acquisition was obtained by establishing a corpus of economics and business texts, which the learners are expected to read during their academic courses utilising computerised technology. The method of think aloud protocols was used to analyse processes taking place in knowledge acquisition, while the product of what was acquired was investigated by means of written recall protocols.

It has been discovered that knowledge acquisition operates on the basis of analogical and to a certain extent metaphorical reasoning. The evidence obtained from the think aloud protocols showed that neophytes were able to acquire fundamental concepts of their future domain by reaching the level of shared understanding with the members of their target community of the faculty. Diaries and questionnaire analyses demonstrated that enculturation facilitated learners' transition from the language centre into the target community. Analyses of the written recall protocols and examinations from the post-enculturation stage of the research showed that neophytes' academic performances in their target community were much higher than those of their non-enculturated counterparts.

Processes learners go through and strategies they spontaneously make use of, especially while acquiring knowledge of a specific domain through L2 have so far remained unexplored research areas. The present research makes a potential contribution to the language and knowledge acquisition theories by examining closely and systematically the processes involved in adults acquisition of domain-specific knowledge through a foreign language and the strategies they employ in acquiring such knowledge. The research findings offer useful implications to English language teaching at language schools. Language teachers are provided with useful guidelines as to how they can provide prospective students of a particular academic community with an experience of acquiring fundamental concepts of their discipline before they become members of their target community.

Key words: Analogical reasoning, concept formation, concordances, constructivist theory, domain-specific knowledge, enculturation, frame theory, knowledge acquisition, metaphorical reasoning, schema theory, target discourse community, think aloud protocols.

for my children
Özge and Bilge

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ABBREVIATIONS

ATA	Aston Text Analyser
B-U	Bottom-Up Processing
CFR	Cultural Frame of Reference
DECOBA	Departments of Economics and Business Administration
EG	Enculturated Group
ELT	English Language Teaching
L2	English as a Foreign or a Second Language
NG	Non-enculturated Group
ÖSYM	Ögrenci Seçme ve Yerlestirme Merkezi (The Students Selection and Placement Centre)
SLA	Second Language Acquisition
TAPs	Think Aloud Protocols
TDC	Target Discourse Community
T-D	Top-Down Processing
YADIM	Yabanci Diller İnceleme ve Arastirma Merkezi (A Foreign Language Centre)
YÖK	Yuksek Ögretim Kurumu (Higher Education Council)
WER	Work-embedded Reading
WRPs	Written Recall Protocols

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OPERATIONAL DEFINITIONS OF TERMS

This section aims to present the operational definitions of some specific terms which are used in the present thesis. These definitions have been arrived at on the basis of a critical engagement with the relevant literature.

Analogical reasoning: Analogical reasoning results from the processes that map the conceptual structure of one set of ideas from the *source domain* which is the familiar domain that serves as a source of knowledge, into another set of ideas called the target domain since it is the new domain being explored (Gentner, 1980, 1983; Holyoak, 1985; Keane, 1985).

Constructivist theory: Unlike transmission theory of learning, constructivist theory puts emphasis on student directed learning and places direct responsibility on the learner's active construction of ideas. The role of the teacher is to facilitate, guide and provide a favourable environment for learning.

Corpus: It refers to a collection of samples of running texts, which is collected and stored in a computer to be utilised for various purposes, such as linguistic analysis. In the present study, a corpus of economics and business text is created to identify the key concepts.

Enculturation: Enculturation, in the present study, refers to a process during which the academic culture or domain-specific knowledge is acquired by the neophytes who are to join their Target Discourse Community. A further aim of the enculturation is to enable neophytes to reach the shared level of knowledge with the expert members of the community on the fundamental concepts of their discipline.

Input: *Input* refers to the language data, linguistic or otherwise, which the learner is exposed to (Ellis, 1990; Nunan, 1991; Lewis, 1993), and it constitutes the point of departure for learning. For the present research, input of knowledge is provided by concordance lines of the key words.

Learning and acquisition: Although no agreement has been reached by the researchers on the definition of these terms, *learning* to Krashen (1976) refers to developing conscious knowledge of the target language through a formal study, whereas *acquisition* is related to the process of internalising knowledge of the target language which results from the natural language use.

Metaphorical reasoning: It is a cognitive mechanism through which knowledge is transferred from one domain into another, as defined by Lakoff & Johnson (1980). It operates on similar principles to analogical reasoning as far as the mapping of knowledge is concerned.

Neophytes: They are future members or as Swales (1990) defines them "new members" of a particular target discourse community. In the context of the present research, they attend the language centre of the university for the purpose of receiving a language training programme, following completion of which they will join their target discourse community.

Target Discourse Community (TDC): A discourse community is defined by Swales (1990) as a group of people who come together under a shared purpose and it has mechanisms of communication among its members to achieve its shared objectives. TDC is a term derived from the discourse community which refers to a particular target community in which the neophytes will participate, such as Department of Economics and Business Administration.

Transmission theory: It is a learning theory in which the teacher acts as a dominant figure imparting knowledge while the students remain passive as the recipients of whatever has been taught to them. It is associated with the traditional model of learning.

Think Aloud Protocols (TAPs): *Think Aloud Protocols* is an introspective method in which learners are asked to verbalise their thinking during a particular task. Protocol studies have been used in the solving of mathematical problems or writing of an academic prose (Hayes & Flower, 1980; Cohen & Hosenfeld, 1981), and some translation tasks (Gerloff, 1986). In the present research, this method is utilised in order to trace cognitive processes involved in knowledge acquisition.

Uptake: During a learning process, not all input which the learners are exposed to is integrated into their existing knowledge. Slimani (1987) used the term "uptake" for whatever information or skills learners claimed to have learned from language lessons. It is therefore considered as the language which the learners benefit from and are able to integrate into their own knowledge base.

Work-embedded Reading (WER): This kind of reading is considered by Roe (1992) as a non-linear reading. It involves reading only the relevant sections of the text depending on the learner's purpose, such as reading for particular concepts.

Written Recall Protocols (WRPs): It is a retrospective method of data collection in which learners are asked to read a text and then write down whatever they can remember about it. In the present research, written recall protocol is used in order to determine the *product* of knowledge acquisition.

CHAPTER I
INTRODUCTION TO THE RESEARCH QUESTION

1.0 Introduction

The present research is concerned with exploring in depth knowledge acquisition with a particular reference to acquisition of domain-specific knowledge and concept formation in a specific domain, economics and business studies, through a foreign language, English, by the prospective students of an academic community in the context of Turkish Higher Education. It aims to explore the ways in which the acquisition process can be facilitated and promoted while prospective students receive a language training programme, at the language centre YADIM (A Foreign Language Research and Application Centre), upon successful completion of which they will join their future academic community, the Department of Economics and Business Administration (DECOBA) which offers some of its courses in English.

The research is also concerned with the efficiency of knowledge acquisition in education. Efficient knowledge acquisition is particularly relevant in a country like Turkey which faces major challenges, particularly, in the context of its recently renewed interest in joining the European Union with whose members it will have to compete and negotiate through a foreign language, mainly English.

The function of English which emerges in Turkey can be accounted for in relation to "international" and "intranational" functions (Kachru, 1995), though the two seem to overlap. External reasons or the international functions of English arise from the need for Turkish businessmen to negotiate with foreign customers in the outside world. Since English is the common language utilised at present in economic and social relations with other nations, Turkey cannot achieve its competitiveness in a world-wide context, if its power to compete is seriously threatened by linguistic factors.

Such competitiveness at an international level has consequences for the national level where English is currently a highly popular language nation-wide, used as a second or a foreign

language (L2) and has been introduced into the education system and adopted as a medium through which subject specific knowledge is transmitted. The role of English, as a second language therefore, emerges from its introduction into Higher Education, especially universities, which deliver courses in English. In the context of academia, English is used by scientists and researchers in order to access scientific and technological information. If members of an academic community, particularly students, are to graduate and be competitive in a world in which science and technology are changing more rapidly, they need to keep up with such developments in order to contribute to the well-being of their nation. To achieve this objective, they need to be equipped with the necessary communicative and professional skills so that they can make their way without linguistic obstacles in their chosen academic and professional lives which require efficient access to scientific information via English.

Conrad & Fishman (1977) argue that since the 1970's, English has been a major world language. It is the native language of many countries throughout the world; but for an even greater number of countries, it is learned as a second or a foreign language. Since it has become the *lingua franca* of the world, it has been used for scientific, technical and commercial purposes by people of many nations. Swales (1985), in discussing English as the international language of research, drew the conclusion based on statistical data that English is the dominant language for the communication of research on an international level and the medium of publication for the majority of the world's research papers and scholarly articles.

At the international level, Turkey's competitiveness, on the basis of scientific and technological knowledge, depends to a large extent, upon its membership of what Kachru (1985) refers to, the "English-using scientific speech communities". Membership of those communities may occur through published articles, attending and holding international conferences and in particular, through consulting written scientific literature and contributing to them. In order for prospective researchers to contribute to international science by producing papers of high quality and giving presentations through English, the requirement is accessing information in a second language so that they are not deprived of recent developments.

Although contributing to international communities involves productive aspects of language learning, efficient access and absorption of scientific knowledge, which is the subject of the present research, would have a significant influence on the productive side. The role of English in Turkey's developmental process mainly involves efficient acquisition of knowledge from written sources. Since instruction through a medium of a foreign language has remained on the agenda of the Turkish Higher Education system, for national development processes, acquisition of knowledge through a foreign language within a specific domain opens up an important research area, which will be investigated in the present study.

1.1 Knowledge Acquisition and Concept Formation

Although concept formation is widely recognised as one of the fundamental concerns of any human knowledge acquisition process (Toulmin, 1972; Hewson, 1981; Carley, 1986; Margolis, 1995), research focusing on concept formation is surprisingly rare in cognitive science. This may partly be due to the fact that the field of knowledge acquisition is relatively new and perhaps partly due to difficulties inherent in gaining access to individuals' mental worlds. Some studies exist on concept formation while learners are learning a particular discipline through the mother tongue, such as learning physics concepts for native speaker students of English through the same language (Osborne & Wittrock, 1983; Hewson & Hewson, 1984; Carey, 1991; Vosniadou & Brewer, 1987). However, the case of students who are learning a foreign language and at the same time are acquiring knowledge of their discipline through that language remains a largely unexplored research area. Thus, research studies that focus on concept formation through a foreign language in a particular domain have largely been neglected. What differentiates the present research from the others mentioned above is that it is not related to learning in the mother tongue, but in a foreign language. It is therefore intended to fill a real gap in the study of knowledge acquisition in this particular area.

In fact, what is particularly crucial in knowledge acquisition and concept formation is the question of what actually goes on in a learner's mind when information is being acquired through the medium of a foreign language and how the acquisition takes place from the very

initial to the very final stage of development. What processes learners go through and the strategies they use have remained unexplored research areas.

Although studies have been carried out by Carey (1985), Keil (1987) and Vosniadou (1987) in connection with the way children acquire knowledge and changes that occur in this process, these researchers stress the need for further research. They state that some information is known about the changes that occur during the acquisition process in children. However, they emphasise that it is still not clearly known how such changes occur and the role that different reasoning strategies may play in them and they offer this as an interesting area for future research. The Data Analysis Section of the present research (see Chapter 6) tries to fill this particular gap in knowledge acquisition.

It seems important to point out that learners within the scope of the present study are not yet experts in their discipline, that is, economics and business studies. Besides learning English, they are also learning economics via English, something which has not been dealt with by other researchers before. The nature of the learners lends itself well to the introduction of a metaphor which will be utilised extensively throughout the present research. In the context of the present study, the plant metaphor will be used in which the acquisition of domain-specific knowledge will be likened to the growth and development of a plant.

1.2 Introducing the Plant Metaphor

Plants need several things ranging from food, fertilisers, soil, to sunlight, etc. to grow. But, first of all, plants need seeds for the growth to take place due to the fact that feeding takes place at a microscopic level. In other words, plants grow microscopically with every development taking place in cells which cannot be consciously explained and organised. Similarly, knowledge acquisition grows microscopically and the microscopic view is derived from the elements offered to learners in input which is extended gradually with learners making their own contribution by bringing in their own world view to this growth process. It is a slow development process leading to the emergence of a world picture and consequently knowledge acquisition and concept formation.

The plant metaphor will be considered at microscopic and macroscopic stages. Similarly, there are two dimensions of *microscopic* and *macroscopic* view to knowledge acquisition with the microscopic view being derived from the elements of input which is gradually extended, so that learners have a larger macroscopic perception of the concept. At the microscopic level of knowledge acquisition, seeds will be provided by the establishment of a corpus of economics and business texts utilising technological facilities. The growth of a plant is a biological process, similarly, knowledge acquisition is also considered as a biological growth in which each new element of knowledge has to be digested and accommodated for microscopic changes to take place. Developments from the initial microscopic to the final macroscopic stage need to be observed in order to determine the processes taking place. The present research is concerned with knowledge growth at the microscopic level and at the same time aims to observe changes at a macroscopic level.

It can be argued that for the individual learner achieving all this alone is not that easy, thus sharing the experience of this process with other learners would facilitate knowledge acquisition and concept formation. We are, therefore, interested in the individual development of concept formation through collaborative knowledge acquisition by adopting a *constructivist* view which places emphasis upon individual construction of knowledge in a collaborative environment.

1.3 Research Objectives

Given the importance of concept formation and the current emphasis upon knowledge acquisition, the present research aims to investigate the knowledge acquisition process with a particular reference to acquisition of domain-specific knowledge and concept formation through English by the prospective students of particular domain, economics and business studies, in the context of Turkish Higher Education. This research concentrates on the process of preparation of the new members or "neophytes" (Swales, 1990) for a smooth transition from the language centre into their faculty. The research also aims to establish conditions while the neophytes are undergoing language training at YADIM that would facilitate acquisition of fundamental concepts of their discipline via L2, which would consequently lead to their efficient access to the written genres of economics and business texts in their faculty.

We are particularly interested in exploring the acquisition process, monitoring the impact of this on learners' academic achievement after they have been initiated and become members of their faculties. Finally, we aim to assess the effects of acquisition by comparing our students with other students who have not received a similar type of training.

We pay particular attention to the acquisition of knowledge in a *non-transmission approach* and take a *constructivist* view to acquisition which places direct responsibility on the learners as actively constructing knowledge. This view is based on the belief that knowledge acquisition comes about as the result of the construction of reality by an individual. Quite frequently, in language acquisition situations, assumptions are made that teachers disseminate new knowledge and information linearly which is simply added and stored by the recipients, particularly by the proponents of the transmission model to learning. What the present research suggests is that knowledge acquisition does not take place as such, but it is the result of individual construction of reality.

1.4 The Scope and Methodology of the Research

The present research is designed and implemented on a two-stage research model which is designed to help acquisition of domain-specific knowledge to take place by the students of a particular discipline through a process of enculturation. Prior to the actual research, a detailed needs assessment was conducted by administering questionnaires and conducting interviews. Next, a specialist corpus based upon written genres of economics and business texts was created by utilising computer facilities. This corpus was used as input during the knowledge acquisition process. The first stage of the research involved setting up an enculturation process while learners underwent the training programme partly at the foreign language centre of the university and partly at the target community. To discover the underlying cognitive processes *in vivo,* as they happened, from a *dynamic* perspective, Think Aloud Protocols (TAPs) were made use of. TAPs were the main source of data collection for tracing developments taking place in the process of knowledge acquisition and concept formation and all the other methods were utilised as contributory research devices to support the major research aim. In addition to this particular data collection method, *the product* of what has been acquired was obtained through the written recall protocols. Personal reflections

concerning this type of teaching methodology was also obtained by eliciting neophytes' responses by means of diaries, questionnaires and interviews, which also provided information about the processes *in retrospect.* The final stage involved monitoring the neophytes' performances in their faculty and comparing this with those of their counterparts.

1.5 Identifying the Problem Area

The problem which provided a major interest for the present research is based upon the small scale research conducted previously (see Kırkgöz, 1993). The evidence obtained from this investigation showed that members of a particular community, undergraduate students of the Department of Economics, experienced difficulties in accessing scientific information efficiently in their department. Economics is an English-medium department where 40% of the courses are taught in English and the prospective students of this department attend the language centre, YADIM, in order to be equipped with the necessary skills which will enable them to cope with the requirements of their department, as will be explained in the next chapter. Students who had attended the language centre and started taking their academic courses expressed a gap between the target faculty requirements and their level of familiarity with their specialist discipline, particularly with the use of specialist lexis. Such learners stated that language courses were useful in general, although the programmes that were provided for them did not prepare them to cope with the demands imposed by their faculty, as a result of which, they encountered difficulties in fulfilling the reading-related tasks assigned.

The present research is an extension of the previous one, (Kırkgöz, 1993) and includes not only the Department of Economics but also the Department of Business Administration currently offering English-medium instruction of one faculty on a larger scale in order to have an in-depth analysis of the problem. In the following section, the preliminary investigation and initial data collection will be described in order to show the motivation for embarking upon the present investigation. During this part of the research, questionnaires and interviews were utilised as research methods in order to obtain qualitative and quantitative data as part of specification of the needs as well as a preliminary investigation into discovering the students' problems, while accessing domain-specific knowledge and the lecturers' expectations of the

students. The rationale for choosing these methods will be explained in detail in the methodology chapter of the research (see Chapter 5).

1.5.1 Evidence From Interviews

Interviews with the lecturers and the former neophytes, then the first year undergraduates, were conducted during May 1994, prior to the end of the 1993-94 academic year. For this purpose, ten faculty lecturers then teaching the English-medium courses and 30 first year undergraduate students were interviewed. Interviews were conducted at DECOBA, each lasting 10-15 minutes on average and they were recorded with the permission of the interviewees for the subsequent transcription and analysis. The research included only the first year students who had undergone the language programme at YADIM, since, as the Head of the Department clearly articulated, the first year is the most critical time in the life of students.

Interviews were "structured" (Hammersley, 1990:31), designed to explore the perspectives of the people concerned, that is, we asked the same directive questions to each participant. These questions served as guidelines and are used to elicit data which "represent the world view of participants being investigated" (Goetz & LeCompte, 1984:3).
The questions listed below were addressed to the former neophytes, during the interview:

-How do you acquire the essential information you need for various assignments and examinations?
-Which written publications do you consult while preparing assignments and examinations?
-To what extent has the reading/writing component of the programme at YADIM been successful in meeting your reading needs in academic content classes in your faculty?
-What kind of problems do you encounter while accessing the written specialist information?
-What kinds of lexical items obscure your comprehension while reading specialist texts?

In the interview with the lecturers, the study examined the expectations they formulated from the students in assignments and examinations; the problems they experienced in their assessment of students' written mode of communication; while evaluating the students' written output, whether they give any importance to the correct use of the key lexical items within related conceptual areas; academic reading tasks expected from them and their opinion of the collaboration with students' target faculty through such research, based on the

anticipatory enculturation experiences prior to learners' entry into their faculty. The analyses of the interviews will be provided in the following sections.

1.5.2 Evidence From Questionnaires

For the purpose of the present research, two separate questionnaires were designed - one for the lecturers and the other for the students "in order to draw accurate information from the respondents by asking the right question to the right person to provide the standard format on which facts, comments and attitudes can be recorded" (Hague, 1993:25). Both the lecturer and the student questionnaires were in the nature of the "structured questionnaire" (Oppenheim, 1996:16) which required respondents to select from among a number of alternatives. Both questionnaires were given in Turkish in order to eliminate all kinds of possible misunderstanding that could arise. Before administering the questionnaires to the actual respondents, the student questionnaire was "pilot tested" (Oppenheim, ibid.) with 50 second-year students of DECOBA and the lecturer one with five English instructors at YADIM and two faculty lecturers to obtain information about the relevance and clarity of the questions that would help us arrive at "valid data" (Kırkgöz, 1993:51). On the basis of the piloting some changes and comments made to the questionnaires have been taken into consideration. The questionnaire was administered to the 135 first year undergraduate students at DECOBA during the Academic Year 1994-95. Only those who had completed the intensive English programme at YADIM were included; others were exempted so as not to distort research findings.

The student questionnaire, which consisted of four sections, was designed to identify the extent to which they employ reading-related cognitive and metacognitive strategies, the motivational elements involved in accessing specialist texts and to assess their strategies in accessing domain-specific knowledge which would also help us identify the nature of reading involved. (See Appendix I for the English version of the Student Questionnaire). The questions were formulated on the basis of findings of our previous research which was conducted with the Department of Economics (see Kırkgöz, 1993).

1.5.2.1 Analysis of the Student Questionnaire

Each question has been analysed separately. In the following section, the summary of the results is given.

Section 1 of the questionnaire aimed to assess the motivational factors involved in reading-related cognitive skills. "Motivational factors" was taken to mean "a belief in oneself as a competent reader" (Ehrlich et al., 1993:5). Thus, the first year undergraduates were asked how they evaluated themselves in relation to various reading-related cognitive skills out of a 4-point rating scale, ranging from the categories "excellent to poor", as demonstrated in Table 1.1.

Question 1 asked the learners how they perceived themselves in relation to acquiring domain-specific knowledge. As seen in Table 1.1, 60% perceived themselves *poor*, over 30% *good* and a small minority *very good.* Question 2 asked them how they rated themselves on remembering what they have read. This ability is really important in remembering ideas collected from various sources. The aim of Question 3 was to find out how they saw themselves on connecting the new information with the previous knowledge, which covers the availability of subject-related knowledge students had acquired. Question 4 aimed to discover how the students rated themselves on understanding accurately the meaning of familiar words used in a specialist sense. The aim of Question 5 was to assess the students' self-perception in connection with understanding concepts related to their specialist field.

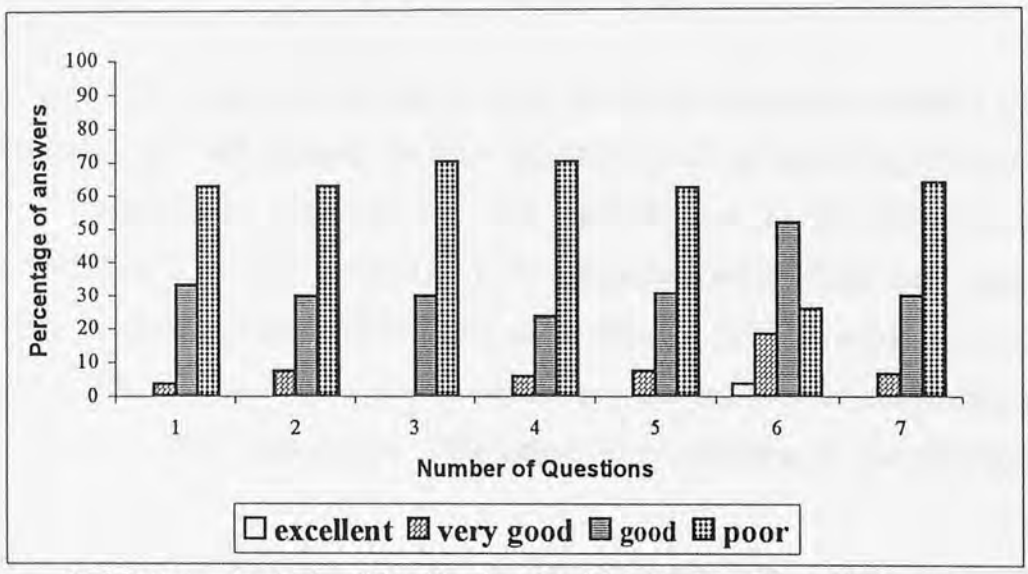


Table 1.1 Analysis of the Section I of the Student Questionnaire

The purpose of Question 6 was to find out how they saw themselves on note-taking. In fact, note-taking is an important academic skill and is also taught as part of the course at YADIM. Question 7 asked how the students rated themselves on extracting the relevant information from the specialist texts in a relatively short time. The ability to perform this of course affects comprehension.

Except for question 6 which involved note-taking, the responses given to the remaining questions were similar in that between 60-70% of the responses were in the *poor* category. For questions 1, 3 and 7 no *excellent* response was marked by the students. It is clear from the analysis that note-taking which is practised at the language centre had made a positive contribution to learners' academic studies although their perception in other categories was *poor*.

Analysis of the questions in Section 2: The questions in this section are based on specific comprehension monitoring strategies learners employ in accessing domain-specific knowledge, as identified in the previous research (Kırkgöz, 1993) and the frequency with which they use those strategies while accessing knowledge of their discipline. The first three questions in this section involve getting the general idea of a text, while questions 4-7 detailed understanding resulting from the comprehension process. The students were asked to rate the frequency of using these strategies out of a 4-point scale ranging from *never* to *always*.

The purpose of questions in this section was to discover the strategies the students use, in other words, whether they read linearly or not. The first question asked the learners the frequency with which they used scanning[1] as a strategy to extract the specific information from the texts. Question 2 in this group asked the frequency with which they practised skimming the text to obtain general information as a strategy in their academic context. Question 3 aimed to discover the frequency with which they guessed the text content from the titles, sub-titles and the textual illustrations. The objective of Question 4 was to determine

[1] In fact, the students are familiar with these strategies, as they are taught in the reading/writing course at YADIM.

how often they could guess accurately the meaning of new words from contextual clues. Question 5 asked the frequency with which the students took notes from the written sources. The purpose of Question 6 was to ascertain how frequently they interpreted non-verbal information in the form of charts, tables, diagrams, etc. Question 6 asked the frequency with which the students were making critical and evaluative comments of the texts they read.

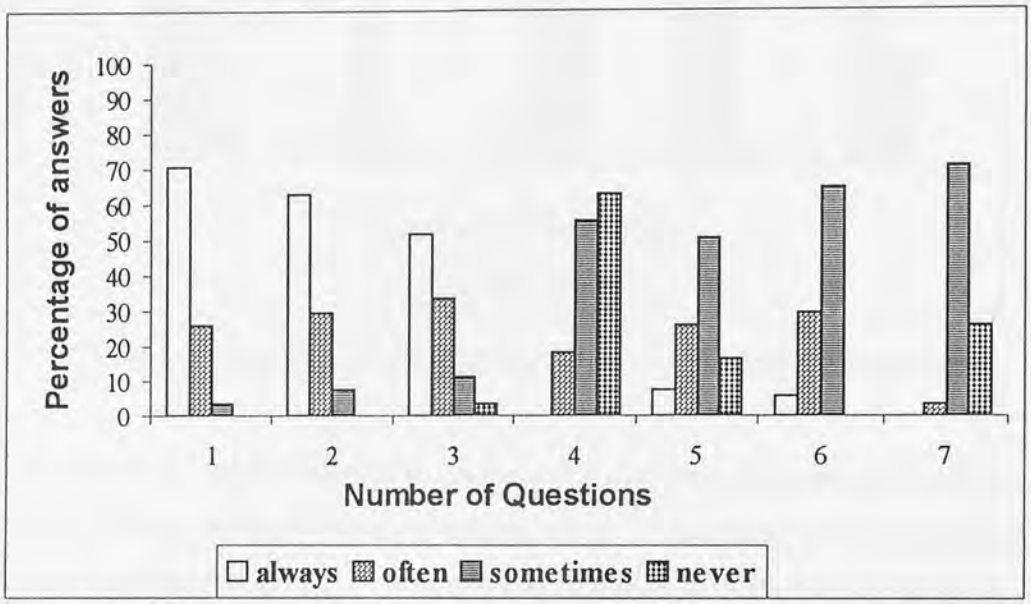


Table 1.2 Analysis of the Section II of the Student Questionnaire

As seen in the table, the majority of the responses given to the first three questions show that between 50-70% used these strategies *always*. *Never* category was not marked for Questions 1 and 2. From the responses given to Question 4, note-taking was frequently practised by the students. Interpretation of charts and tables was even less frequently done, compared to note taking. In Question 6, the majority, about 60% could sometimes guess accurately the meaning of unknown words. Similarly, it was found from Question 7 that making critical and evaluative comments was sometimes made by the majority, 60% of the students.

Analysis of the questions in Section 3: The questions in this section measure learners' academic self-concept of ability and assess their perceived competence in five major areas related to reading in which learners were instructed to choose only one alternative. The result of the analysis is illustrated below by Table 1.3. In the table, a-d, represent each alternative answer.

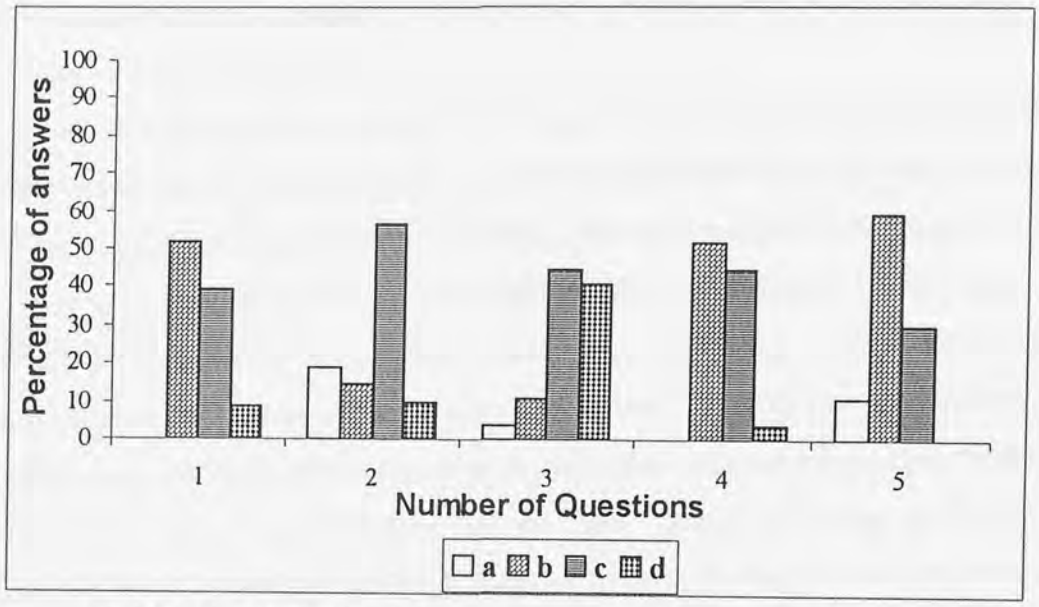


Table 1.3 Analysis of the Section III of the Student Questionnaire

The first question in this section wanted to uncover the students' perception of how successful they found themselves in several reading-related areas. According to the responses given, 50% of the students could understand most of what they read with the help of a dictionary; just under 40% half of what they read; while under 10% only a very little of what they read. The purpose of Question 2 was to assess the strategies students employed in coping with unknown words. The analysis indicated that over 55% looked up a dictionary, while under 20% used contextual clues.

Question 3 in this section aimed to determine how well the students interpreted the meaning of the familiar words used in their related specialism. According to the responses given, the minority could understand accurately the meaning of all the new words; 40% could understand accurately only a few of the words, while 45% half of the new words and 5% most of the words.

The fourth question asked how the students read the specialist texts. None of them read the text completely; 50% read the sections which they felt important for them; and 40% read the sections they could understand and under 10% read the sections emphasised by the lecturers.

The final question in this section of the questionnaire asked when they read subject-related texts and articles. According to the responses given, over 10% read regularly; the majority (60%) read before the examinations, whereas 30% read before preparing projects, etc. The

analysis has shown that the majority of the students have a tendency to read prior to taking examinations or writing projects.

The results further indicate that students do not read the whole texts, rather the parts relevant for their purposes. This finding is consistent with the interviews done with the former students of the economics department (Kırkgöz, 1993). Hence, it can be concluded that students' reading style is in the nature of *work-embedded reading* to be defined in Chapter 3. It was also found that all students use strategies (scanning, skimming, etc.) necessary for work-embedded reading. In the open ended question, it was stated by the 25 students that their major reason for using such strategies was to focus on the concepts only, rather than reading in detail, for which they stated that they had no time. Some and more motivated learners mentioned that they browse or read the articles all the way through, however, others claimed they read non-linearly, reading only for the key concepts.

Analysis of the questions in Section 4: This section was in two parts. In Section (a) students were asked whether they possess the recommended course books or not. In section (b) of the questionnaire, the idea was to determine which written texts they consult while preparing assignments and for examinations. The results indicate that the large majority of them (81%) possessed the two course books recommended. The result of the second part of this section showed that the students utilise all the sources ranging from books (75%), journal articles (6%), lecture notes (12%) and consulting their friends (7 %) in various proportions.

1.5.2.2 Analysis of the Lecturer Questionnaire

The lecturer questionnaire consisted of four structured questions. (See Appendix II for the English versions of the Lecturer Questionnaire).

Categories	Number of Lecturers
(1) Understanding concepts	8
(2) Assessing factual knowledge	6
Interpreting tables, diagrams, etc.	1
Critical evaluation of knowledge	1
(3) Interpreting tables, diagrams, etc.	6
(4) Finding relationship between factual information	1

Table 1.4 Analysis of the Lecturer Questionnaire

Question 1 asked what the lecturers assessed in the students' assignments and examinations, that is, the written mode of communication. While answering this question, the lecturers were asked to put the choices provided in the questionnaire in order of priority and add any extra item they assessed which was not listed on the questionnaire. As presented by the above table, all lecturers who responded to the questionnaire gave priority to *understanding concepts*, while 6 of them marked "assessing factual information" such as definition and classification as the second point of importance. One lecturer rated "critical evaluation of the knowledge" as being of secondary importance, while the remaining one lecturer who marked only two choices in the questionnaire rated the next important item of assessment to be interpreting tables, diagrams, etc. For the six lecturers, the third item of importance in their assessment procedure was interpreting diagrams, tables, etc. One lecturer added "finding a relationship between factual information" to the available list. The responses to this question underlie once again the importance given to the acquisition of concepts and "understanding concepts and factual knowledge" in scientific discourse.

The responses given by the lecturers confirmed the questionnaire results obtained from the students in that understanding concepts is the primary requirement expected by the first year undergraduates, while making critical comments is not that much expected from them.

Question 2 aimed to determine the sources upon which examination questions depended. According to the responses given by the lecturers[2] the largest percentage of sources from which examination questions were derived were indicated to be the course book. The percentage being 70% for three lecturers and 90% for the remaining seven lecturers. In addition to the course book, two lecturers based their examination questions on the lecture content, that is, what is explained and discussed during the lecture itself. For one lecturer, however, the second source of the examination questions was the lecture notes (20%) and for the final lecturer, 30 % of the questions was based on the problems set which accompanies the course book and the case studies.

In Question 3, the lecturers were asked what percentage of complex structure and vocabulary they used in explaining domain-specific knowledge. The aim was to assess the degree of

[2] The lecturers are native speakers of Turkish with PhDs obtained in foreign countries.

students' comprehension of the domain-specific course book language and if the lecturers are having to simplify the language in order to adjust it to the level of the students. Moreover, questions in this section are intended to give some information concerning the content and the structure of the lectures, rather than the lecturers' teaching style. According to the responses given, for one lecturer 20% of his lecture time was taken up by explaining the complex structures and concepts. For another lecturer, this percentage was 41-60% of the class time and the remaining two lecturers marked this as between 61-80%.

The last question asked the lecturers if they proffer Turkish explanations in lectures and if so, the amount of time spent on this during a particular lecture. For one lecturer, explaining the lexical items and concepts in Turkish was rarely done. For the two lecturers 20% of the lecture time is taken up with this issue. One lecturer stated that he never provided the Turkish explanations in his lectures. As an alternative, he inserted the Turkish equivalent of a new vocabulary item or a new concept as they occurred in his lectures. He illustrated this with a few examples, such as, "anticipated inflation and marginal utility" followed with the Turkish equivalent. This is done deliberately in order to avoid students' misconceptualising and misinterpreting the meaning of new concepts. The lecturer further noted that the frequency of this explanation was higher during the first few months of the year and as the students become familiar with their field of specialist knowledge, the frequency decreases.

1.5.2.3 Analysis of the Interviews

The interviews were transcribed and then translated into English. Transcripts were read by noting the recurrent themes to obtain data reduction which is defined as a "process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in transcriptions" (Miles & Huberman, 1994:10). This method of data analysis involves scanning the data for categories in order to find relationships among categories and examining the data "for meaningful themes, issues and variables, to discover how these are patterned and to attempt to explain the patterns" (Goertz & LeCompte, 1984:180). Analysis is further described as a systematic way of developing and refining interpretations of the data to develop categories by sorting reiteratively through the data (Taylor & Bogdan, 1984; Johnson, 1992).

The following categories are identified as a result of the content analysis of interviews conducted with the lecturers and the students:

Categories	Percentages
Problems in the acquisition of domain specific knowledge and concept formation	45%
Lack of familiarity with domain-specific frame of reference	34%
Adjustment difficulties	28%
Poor reading habits	12%
Level of proficiency in English	10%

Table 1.5 Categories Based on Analysis of Interviews with Lecturers and Students

Problems in the acquisition of domain-specific knowledge and concept formation: The first critical problem learners commonly experienced was in the area of acquiring domain-specific knowledge and concept formation. Such difficulties experienced led many former neophytes to learn by heart memorising information. Due to the lack of a domain-specific knowledge, students experienced problems in accessing written knowledge of their discipline, as a result of which many of them stated that they were memorising the textual information rather than learning it *meaningfully*. The course books utilised by DECOBA for the English-medium courses are of foreign origins and they are originally written for an American or British readership, not a Turkish readership in mind. Thus, accessing the specialist knowledge was creating difficulties for these students.

Lack of familiarity with the domain-specific frame of reference: The second category of difficulty was found to be connected with lexis related to a domain-specific frame of reference. As stated by one of the students:

"To know the meaning of words as they are used in the economics sense is essential. What we experience here in our department is that some words have different meanings when used in economics from the meaning we know from our previous knowledge and we have difficulty in understanding them. Grammar is of secondary importance for us. If we had acquired a sufficient knowledge of lexis before, we could now understand the economics texts easily. Every time I read an economics text I get 20-30% of new words which puts me off from reading further".

From this statement it is obvious that the learner is unfamiliar with his target discourse and associated lexis. They also mentioned that there was a considerable amount of technical terminology, which they had to learn to access the written genre of economics texts. Now that they were in the academic classes, the burden of learning new lexis created difficulties and much time had been lost since they had frequently to search the dictionary. The students perceived the objective of the reading/writing component of the programme at YADIM to involve assisting them in the acquisition of lexical knowledge with a domain-specific frame of reference. The lecturers stated that lack of domain related lexical knowledge led many students to translate certain words from L1 into L2, which resulted in all sorts of misunderstanding as in the example which is given by one of the lecturers to illustrate the situation; "tax evaders" was translated as "tax smugglers" by the learners.

Adjustment difficulties: The discourse community members, both the lecturers and non-enculturated learners who were interviewed mentioned that the first year, particularly the first couple of months was the most critical period in the academic life of students. When the students start their academic studies as *uninitiated* or *non-enculturated* (these terms will be defined in Chapter 4) members of their future academic communities, it is argued that they spend the first two crucial months getting acclimatised to all the new factors. We consider this period as the *adjustment period.* As a result of this, many students stated that they felt alienated, lacked motivation and were therefore discouraged from continuation of their studies, which seems to correspond to a "reality shock", (Hughes, 1985), as will be expressed later in relation to the notion of community (see Chapter 4). It is stated by the lecturers that those who are successful in overcoming adjustment difficulties can survive, while others can go through real hardship.

In connection with the adjustment difficulties, motivation of the former neophytes was very minimal. One way of motivating the students to read more books, as was stated by the Head of the Department, was "in order to get students into the habit of reading, I give them essay questions in the examinations based on the textbook". The interview findings confirm the questionnaire findings in that the majority of the students read under "discourse community pressure" Swales (1990), that is, prior to taking examinations or writing projects, etc.

Poor reading habits: A further critical problem found by the lecturers was the amount of time students spent on reading. It was claimed by the lecturers that students spend less time on reading specialist texts than they were expected to. As a result of this, they lack the necessary reading strategies as well as the specialist knowledge of their discipline and did not develop good reading habits. As stated by the Head of the Department, "students start their academic courses without having acquired adequate reading habits, that is, they are not in the habit of reading regularly". One lecturer stated "they are very good at getting the gist or the main points of the texts they read, however, they fail in detailed understanding".

All students interviewed believed that acquisition of domain-specific knowledge while receiving the language programme at YADIM would have been of paramount importance in preparing them for their future academic studies. From the interview and questionnaire results evidence obtained may suggest that the current programme is not sufficient preparing new members for smooth and gradual absorption to the new community.

Level of proficiency in English: The last factor leading to difficulties in the acquisition of domain-specific knowledge and concept formation was related to the level of proficiency in L2. It is interesting to note that in their perceived needs of order of criteria, the level of proficiency ranks last. Since the majority of the students who complete the language programme constitute the lower level proficiency in relation to their knowledge of general English (68% of all students score between 60-69 out of 100, according to the 1995 statistics) it was recommended by both the lecturers as well as the students that while receiving the language training programme at YADIM students should be encouraged to study more and be subjected to a more intensive programme than at present. One lecturer stressed that "they should be given the spirit they need". In fact, the spirit they need can be associated with the spirit of the community, as will be explained more specifically in a later section, Chapter 4.

The proposal commonly made by the lecturers was that prior to neophytes commencing their academic courses, they should be offered some introductory courses at YADIM which would assist with familiarisation of the concepts and the related lexical items. The same proposal was also frequently made by the first year undergraduates. A second proposal made by the lecturers was that they wanted to collaborate with the language centre and that they were

interested to know the students' level of economics knowledge and their range of subject-related vocabulary at the entry level to the faculty.

However, the present programme at YADIM has rarely addressed such issues as incorporating elements of domain-specific knowledge into the reading/writing component and integrating the two communities. While recognising the importance of such basic practices as course design, it is contended that neophytes who intend to move into their English-medium faculties need to be familiarised with the concepts of their disciplinary knowledge. This research thus explores the possibility of linking the two communities by enculturation in order to remedy the present shortcomings and argue for the establishment of what is to be called domain-specific knowledge acquisition.

1.5.3 A Summary of Findings

Participants to the research, both the lecturers and the non-enculturated learners have given us a macro picture of their understanding of the current communication practices and their expectations from the language programme and what they said through the questionnaires as well as interviews gave the opportunity of getting at the reality of their worlds by recording their "voices" (Nunan, 1995:21). Research findings indicated that learners' views were compatible with those of the lecturers.

From what has been described in the preceding section, it was obvious that linguistic difficulties in L2 and conceptual difficulties both in L1 and L2 of economics students, within the scope of the present research, reduced their efficient functioning within their faculty. Both the lecturers and former neophytes required an initiation into the faculty. Needless to say, the language programme designed without the relevance to these expectations would only be marginally relevant to the prospective students of DECOBA. In our research, it has been revealed that students entering the university for the first time face many problems associated with arriving in a new learning environment and for those at DECOBA these problems are compounded by having to learn their domain-specific knowledge through the medium of English as a second language.

As Wilson (1990) argues, the existence of a problem calls for a solution. The present research is therefore set up to investigate and resolve the problem identified as a consequence of conducting the preliminary investigation described above, which provided the evidence and motivation for the need to embark upon the present investigation. It is expected that the study will provide better circumstances, under which learners' acquisition of domain-specific knowledge could be facilitated prior to their initiation into their faculty. A further motivation for carrying out the present investigation derives from the absence of any empirical research in knowledge acquisition and concept formation through a foreign language.

1.6 Research Questions

The findings of the preliminary needs assessment provided the motivation for formulating the research questions which will be investigated throughout this study. It seems clear from the findings of needs assessment that certain conditions need to be established to facilitate knowledge acquisition and concept formation of future members of DECOBA via L2, while they are attending the language centre of the university.

The main research questions which the present research addresses are:

1. How can one, in practice, go about establishing prerequisites, *sine qua non* conditions of knowledge acquisition and concept formation via L2 in a Turkish university?
2. How can one best arrange to make visible what is going on in the learners' minds?

Our preliminary findings have shown that learners have not learnt much while attending YADIM in relation to acquisition of knowledge in their specific domain. Therefore, the first research question involves establishing conditions that would facilitate acquisition of domain-specific knowledge while neophytes receive the language training programme at the language centre of the university. It is essential to be able to trace and analyse what kind of cognitive processes are taking place from the very initial to the very final stage of development in order to have a clear picture of the acquisition of domain-specific knowledge. The second research question aims to investigate this.

1.7 Preliminary Hypotheses

Based on the preliminary research described above, the following initial hypotheses will be formulated tentatively, which will be revisited after establishing the theoretical structure of the study.

The first hypothesis is related to the cognitive development and growth of knowledge. In view of the plant metaphor introduced earlier, it is hypothesised that if the cognitive growth proceeds with gradual introduction of second language input, then there will be a corresponding growth in the individual's knowledge of a specific domain.

The second hypothesis is related to the circumstances under which knowledge acquisition can be established. It is hypothesised that knowledge of a discipline can only be acquired when neophytes are provided with the conditions which will be conducive to the acquisition process, through which they can perceive themselves as members of a community with a perception of a need for acquisition.

The final hypothesis will be related to observing this growth. Despite the difficulties involved in observing both micro and macro processes, in reality, they both can be traced and observed. Based on this statement, we hypothesise that knowledge acquisition is a gradual process of development, starting with small traces of knowledge and enlarging gradually until learners have acquired domain-specific knowledge of their discipline, under the required conditions provided.

1.8 Thesis Outline

The present thesis consists of eight chapters. Chapter One establishes the research area, presents a brief background to the research undertaken and introduces research questions and hypotheses.

Chapter Two gives the sociological context of the study. It traces the origins of foreign language instruction and the underlying reasons for introducing it into the Higher Education in Turkey. The theoretical framework underlying our study is investigated in two separate but related chapters.

Chapter Three is devoted to the first theoretical review in which some relevant current theories of mental representation of knowledge are examined; learning theories are reviewed; the role of constructivist theory to learning is highlighted; a distinction is drawn between meaningful and rote learning and the processes in converting input into knowledge are described. In this chapter, a hypothetical model for acquiring domain-specific knowledge is introduced and developments in analogical and metaphorical reasoning strategies are investigated.

Chapter Four deals with the second component of the theoretical framework. First, it gives a definition of the notion of discourse community and the target discourse community with its characteristics. Next, the culture in general and the academic culture in particular are defined; the theoretical background to enculturation is discussed and the framework which will be utilised concerning enculturation studies is illustrated. The chapter ends with highlighting the necessity of creating a specialist corpus based on the computer facilities to be utilised in knowledge acquisition.

Chapter Five sets out the design of the research which is developed in the light of the theoretical investigation in order to implement the enculturation process whereby neophytes can be initiated into the culture of the academic discourse community and their acquisition of domain-specific knowledge can be facilitated. Here, components of the enculturation model are elaborated.

Chapter Six is concerned with presentation and analysis of the data obtained from various major sources: TAPs, the written recall protocols, evaluation forms, diaries and examinations. The discussion and evaluation of the data is dealt with in Chapter Seven. In Chapter Eight, the significance of the research findings is interpreted, original contribution is offered and the conclusions drawn from this investigation are presented. It is also explained how the hypotheses formulated at the outset of the research are supported by the findings and theoretical and pedagogical implications of the study are set forth. This final chapter also highlights aspects of further exploration of this research area.

CHAPTER II
SOCIAL CONTEXT OF THE STUDY

2.0 Introduction

This chapter provides background information to English-medium instruction in Higher Education in Turkey. First, the origins and developments of foreign language instruction are traced and the underlying reasons for introducing foreign language instruction into university education are explained. The context where the present research has been undertaken, the university and its language centre, are also described. The chapter concludes with an explanation of the changing policy adopted by the government in relation to English-medium instruction at university level in Turkey.

2.1 Background to Foreign Language Teaching/Learning in Higher Education in Turkey

The origins of foreign language education in Turkish Higher education date back to the second half of the 18th century, the Tanzimat era, which formed the transitional period between the last part of the Ottoman Empire and the beginning of the Republic of Turkey. During this period, a process of reorientation in the area of education commenced. The nation maintained close contact with the Western world with the aim of initiating modernisation movements in the field of education. This stage also marked the introduction of a foreign language into the Turkish Higher Education system.

The necessity for a new concept in education via a foreign language led to the establishment of schools. The first institution teaching through the medium of English was the University of Boğaziçi, formerly Robert College, established in 1868 and converted into a university in İstanbul in 1912 (Demircan, 1988). Although the University of Bogaziçi had the reputation of being the first institution at higher education offering English-medium instruction, it was followed with the establishment of the Middle East Technical University (METU) in Ankara, in 1954. Following this, several other universities opted for English-medium instruction in higher education. Since 1981, there has been a rapid increase in the number of universities offering instruction through a foreign language, particularly English.

The current state of universities offering English-medium instruction is illustrated in the booklet published by the Students Selection and Placement Centre (ÖSYM) in 1998. According to the booklet, there are 26 universities, both state and private, offering either partial (where 30-40% of the subjects courses are taught through English), or full English-medium instruction, i.e. all of the courses are taught in English. Nine universities offer entire English-medium instruction, of which only two (Ortadoğu and Boğaziçi universities) are state universities while the remainder are all recently established private universities. Çukurova university where our research has been undertaken offers only part of its courses in English. Notably, all privately-run universities offer all of their courses in English. Students need to take a university entrance examination, the result of which determines whether they attend a public or private university. A further factor which determines students' choice to attend a private university is related to their financial situation.

2.2 Why English-medium Instruction?

Education via a medium of language other than the native language has interested researchers. Jones & Davies (1983) highlighted the reasons for learning other languages for the nations as a whole, as follows:

> for as long as human beings have learned the languages of nations other than their own, that learning has been purposive: that is to say, foreign languages have been learned not for their own sake but as vehicles for social and economic contacts and for the transmission of ideas.
> (Jones & Davies, 1983:1).

The main reason for providing the young generation in Turkey with the opportunity of maintaining their higher education through a foreign language and introducing English into the higher education system has been highlighted by a Turkish researcher Demircan (1988) as maintaining close relations with the outside world as well as increasing the development and modernisation process. This confirms the statement by Jones & Davies (1983) that languages of other nations are learned to serve a specific purpose. It was also stated in the previous chapter that in the case of Turkey, the underlying reason for learning English has been the need to maintain economic and social relations with other nations as well as with the scientific and technological developments of the world. In the context of academia, however, the underlying reason for learning English can be attributed to accessing scientific and technological information for future scientists and researchers of Turkey from written sources in order to be acquainted with the latest developments in their field of specialism.

The following section describes the language centres where English language training is offered to prospective students of English-medium departments.

2.3 The Language Centres

According to the Higher Education Act, the official language of instruction in universities is Turkish. However, the purpose of English-medium instruction is:

> To enable students, who are registered in an English-medium department, to access scientific and technological information published in English in their related disciplines and equip them with the necessary skills so that they can contribute to international meetings and conferences by means of discussions and publications. (Translated from the Official Gazette 1984).

Since its initial introduction into the educational system, English has retained its role at an increasing rate. The necessity for offering language programmes has led to the establishment of language centres and English-medium universities have started to offer language courses to the students whose level of proficiency in English falls below the level specified by the related language centre, prior to learners embarking on their academic courses. Since the purpose of the language centres is to serve the language needs of the English-medium faculties, they hold a crucial role in the efficient functioning of such faculties and subsequently the nation, that is, they serve a *mediating* role.

Since the establishment of language centres, several research studies have been conducted in Turkey in the field of needs analysis, syllabus design, materials analysis, etc. The research carried out by Enginarlar (1982), for example, focused on analysis of freshmen students' needs and difficulties in writing academic English. The research by Karataş (1983) attempted to identify variables in ESP course design. Furthermore, Herguner's (1990) research assessed students' needs for a graduate level course.

Despite such studies, current foreign language education has generally been regarded as a problematic issue. Undoubtedly, all these research studies have indicated the possible difficulties learners experience at English-medium education at university level and have proposed solutions for the improvement of the situation. Yet, they have not prevented complaints made against foreign language instruction, nor have they alleviated linguistic and conceptual difficulties experienced by students while undertaking their academic courses. The common concern regarding the shortcomings of foreign language courses in implementing the desired changes in prospective members' ability to cope with potential demands from the

academic community has been a main reason for the growing interest in the focus on designing courses with better provision facilities. However, most of the research studies mentioned earlier have been highly descriptive in nature, providing lists of recommendations and suggestions to be incorporated into the curriculum of the language centres. One main issue that has been overlooked by researchers is that the language centres and English-medium departments for which the service is provided have been largely kept apart; that is, the two systems have never been seen as an integral part of the whole education system.

The Turkish government's current policy is concerned with increasing the higher education opportunities, consequently resulting in the admission of large numbers of students into the universities. In the face of increasing quantity, as argued by Reeves (1992) the concepts of "quality, efficiency and effectiveness" are becoming ever more important as the major criteria in foreign language learning. In this view language centres play a crucial role in the service they provide to the outside world. On the face of the rapid increase in the number and popularity of English-medium universities and with a growing number of students who demand to attend such universities with expectations of better job opportunities and the advantage of learning a foreign language, one would raise this particular question: "To what extent are the language centres sufficiently equipped with the necessary facilities to provide foreign language instruction that meets the objectives laid down by the promulgation?".

If the required facilities are not sufficiently provided, one would suspect that the current educational policy concerning English-medium education is likely to jeopardise the educational system in higher education rather than enhance the quality. If the foreign language instruction, in this case, English is to act as a real obstacle to the acquisition of professional knowledge which the universities are expected to provide, one would then question the value of foreign language medium education and consider the possible course of action that needs to be taken against the resulting problems in order to rectify the situation.

In order to examine the situation in more detail within the scope of our study, an overview of a particular community will be given. The following section provides a description of Çukurova University, the language centre, with its structure and the relationship between the language centre and the English-medium departments in order to give an overall picture of the academic network. The training process in the language centre is considered as a representative sample of all English-medium universities' language centres.

2.4 The University of Çukurova

Çukurova University occupies an important place among Turkish universities. Located in the southern city of Adana, it is the third largest university in Turkey and considers its primary objective to be producing highly qualified graduates for Turkey as a top priority. Since its foundation with the Faculty of Agriculture and the Faculty of Medicine in 1973, it has enlarged up to 10 faculties, 7 vocational colleges, 3 institutes and 25 research centres by 1997. (Çukurova University Prospectus, 1998).

In 1983 the university senate decided that approximately 40% of courses be taught in English in some faculties of the university. Following this decision, the first faculty to offer part of its courses through English was the Department of Economics and Department of Business Administration (hereafter DECOBA). English-medium instruction at undergraduate level was thereby initiated at DECOBA during the academic year 1983-84 (Official Gazette, January 3, 1984 no:18270).

It is stated in the university's prospectus concerning DECOBA that:

The Department of Economics and Business Administration was established in 1982. Students who have been successful in the University entrance examination and are eligible to attend this faculty are required to take the English exemption test. Those who are not successful in this examination are registered to attend the English preparatory school which consists of two terms each 14 weeks. Students who are successful and are exempted from the language programme can start their undergraduate courses immediately, which consists of 8 academic terms. In the faculty, approximately 40% of the subject courses are taught in English.

(Çukurova University Prospectus, 1998:267).

The first year programme in this particular target context consists of three major courses offered through English. Introduction to Economics and Introduction to Business Administration are required one-term (14-weeks) introductory courses and Macroeconomics is a third course offered during the second term. All three courses consist of twice-weekly, one-hour lectures given by the academic staff. Evaluation is based on two mid-term examinations (60%) and a final examination (40%) and some writing assignments. According to the objectives prepared by the lecturers the examinations and assignments require the students to demonstrate their knowledge and understanding of the concepts (ideas, theories, models and principles) of economics and business studies, as well as their ability to apply these concepts to a variety of situations, in the form of a case study or small scale research. Thus, the acquisition of domain-specific knowledge and concepts are of crucial importance for success in the academic classes.

The learning of one's specialist knowledge via the medium of a foreign language is expected to give young people an additional advantage. This has been expressed as giving graduates better education and job opportunities and increasing the university's competitiveness among other English-medium universities (informal talk with some faculty lecturers). Due to the possible advantages it offers, the University of Çukurova has selected English, as a linguistic vehicle, for accessing domain-specific knowledge. Within a particular community where part or all of the subject courses are taught through the medium of English, the language fulfils what Brown & Yule (1983:1) consider a "transactional function", where it is used to convey content or factual information, that is, it acts as a vehicle for transmission of specialist knowledge.

The introduction of English-medium education at DECOBA in Çukurova University was followed with two more faculties; the Faculty of Engineering and the Faculty of Sciences and Letters. The Faculty of Engineering embarked upon English-medium instruction in the Academic Year 1990-91 with three departments; Department of Civil Engineering, Electrics-Electronics and Mechanical Engineering following the YÖK's (Yüksek Öğretim Kurumu, Higher Education Council) decision (published in the Official Gazette dated 12.4.1990, no: 90.17.535) proposing that departments with adequate infrastructure facilities could commence English-medium instruction.

A department wishing to embark upon the English-medium instruction needs to meet certain criteria laid down by the YÖK. In the official gazette (dated 7 October 1994, no:22074 page 3) the regulations, objective and the content of the English-medium instruction in Higher Education were laid down. It was stated in the regulation by the YÖK that:

In Higher Education the language of instruction is Turkish. However, the institution wishing to offer its courses through a foreign language could only start doing so provided it meets certain criteria (which are listed below) and the decision has to be approved by the university senate. (Çukurova University Prospectus, 1998:267).

The criteria proposed were as follows:

1. The department should have a number of qualified and adequate lecturers with a sufficient knowledge of the foreign language who could deliver subject courses to students via that language. It should also have a language centre where the students can learn English.

2. The department should have an adequate number of written materials published in the foreign language on the subject of that discipline available either in the university or the departmental library.

The department concerned with the English-medium instruction needs to meet the above criteria before embarking upon such instruction. However, due to current financial constraints the libraries are poorly stocked with written materials in English.

Subsequent to embarking upon English-medium instruction, the Department of Electrics-Electronics proposed to the faculty administration board a fully English-medium education. This decision was approved in the faculty's Administration Board as the department had the necessary infrastructure laid down by the YÖK to offer its students a fully English-medium instruction (Administration Board meeting dated 28.11.1994, meeting no:94/12 minute no:2). Similarly, the department of Mechanical Engineering, too, started to offer its students a fully English-medium instruction.

2.4.1 The Establishment of YADIM

The Language Centre, YADIM, (Yabanci Diller Arastirma ve Inceleme Merkezi - A Foreign Language Research and Application Centre) was established on 24 February 1990 to serve the needs of the English-medium departments of Çukurova University.

The function of the centre is specified by the University Senate as:

> to bring the students enrolled in an English-medium programme to a level where they can access scientific and technological information published in English in their related disciplines and equip them with the necessary skills so that they can contribute to international meetings and conferences (Translated from YADIM's promulgation, 1990).

As in other English-medium universities, to function effectively in their related English-medium departments, prospective students registered in one of the English-medium departments of Çukurova University are expected to have reached a certain level of proficiency in English through which their subject courses are to be taught. Before starting on their courses, students take an examination, exemption test, prepared by the testing unit of the centre, which assesses their current language proficiency. Those who succeed in this examination by scoring 60% or above can start their courses in their prospective faculties, others are required to follow the language programme for one year. The results of the

exemption test administered at YADIM showed that only a small percentage of high-school graduates are considered eligible to be exempted from such a test. According to the results of the exemption test given in October 1998, 25% of the students were able to pass this test and start in their department, Business Administration, this was 13% for the Department of Economics, 9.5 % for the Department of Econometrics and 4.5 % for the Department of Finance.

The language training programme at the centre can be considered as a process of transformation, at the conclusion of which new members or "neophytes" (Swales, 1990) can be expected to have reached the level of competence stated in the objective of the centre, which includes their ability to access domain-specific knowledge. Since approximately 40% of the courses are offered via the medium of English at some faculties, the efficiency of education within these faculties depends to a large extent on the efficiency of the transformation process at YADIM. If the first transformation process fails to bring its outputs, that is, the students, up to the level of the objective decreed in the promulgation at the end of the one year education period, then the transformation process within the faculties is unlikely to be conducted efficiently.

Since YADIM has undertaken a mediating role at initiating members into the respective English-medium Target Discourse Communities (TDCs hereafter), an efficient transformation into the target faculties will be achieved if the linguistic difficulties of the learners are overcome, if neophytes, while receiving the transformation process at the centre, are provided with opportunities that would facilitate the efficient acquisition of domain-specific knowledge in relation to their chosen field of specialism.

The concept of efficiency, for the present context, can be defined in relation to answering this major question: "Can neophytes, having received the education programme at the language centre, speak on the same linguistic terms as those of the lecturers, expert members of the TDCs, that is, can they attain the same level of shared understanding that would enable their efficient absorption of domain-specific knowledge?". It is only when the outputs of the language centre are able to meet the faculty requirements that it can be said that for the young generation such an undertaking has been a worthwhile experience.

2.4.2 The Internal Structure of YADIM

Since its establishment in 1990, the syllabus of the centre has undergone changes. During the first year after its establishment, some available coursebook materials were used and throughout the following year (1992) the course materials were based on a collation of relevant materials from various sources. Some preliminary needs assessment studies were conducted in faculties by the teachers to identify the actual needs of the TDC members. It was not until 1994 that an adequate empirical data illustrating specific academic language demands of TDCs the centre is serving was conducted with small scale research among the students of DECOBA (Kırkgöz 1993, see also Kırkgöz, 1996). This has been supported by other studies (Yıldırım, 1993; Altuğ, 1995; Hergüner, 1995; Matpan, 1996).

The programme consists of four levels. Each level corresponds to different language proficiency; Level 1 corresponding to the lowest level while level 4 to the highest. The complete academic year is divided into four blocks of eight weeks. Language and skills components constitute the two major components of the programme. With reference to the language component, the main focus is to teach grammar, whereas in the skills component reading/writing and listening/speaking are offered as integrated rather than as separate courses. At higher levels the proportion of time dedicated to the language component decreases in favour of the skills component in order to give learners the opportunity to improve the skills necessary to conduct various academic tasks in their actual context, that is, in the faculties. (YADIM Staff Consultation File, 1993-94). Before learners are admitted onto the programme, they are assessed via an exemption test, as a result of which they are placed in one of the four levels. On completion of the programme, learners are required to take a second exemption test which is used to assess their exit level of proficiency from the programme.

The programme focuses on developing various academic skills in the learners such as note-taking and summary writing yet the enculturation process (to be discussed in Chapter 5/Section 5.8) has been largely neglected. Another argument which can be raised in relation to the existing syllabus at YADIM is that it separates the language and academic content or the culture dimension, which neophytes will encounter having completed the language centre in their TDC. In order to integrate a content dimension into the existing programme at YADIM, it seems crucial to investigate the relationship between YADIM and TDCs in order

to establish an idealised model under which YADIM should operate. In the following section, this relationship is examined from the perspective of *General Systems Theory*.

2.4.3 What is an Idealised Outside Training Institution?

The whole idea of educating learners at an outside institution such as a language centre could be conceptualised in terms of *transformation* which may be viewed as a process in which a learner who does not possess the quality or ability is transformed into someone who possesses these qualities or abilities. As pointed out by Checkland & Scholes (1990:33) transformation refers to the idea where "some entity; the input is changed or transformed into some new form of that same entity; the output". In the context of a language centre, however, transformation can be considered as a process in which a learner changes from being a non-member to a prospective member of an English-medium department.

In order to attain efficient transformation, it may also be necessary to incorporate a *Systems Approach* to the study of the educational activity. The relationship between YADIM and TDCs can be approached via systems theory in order to offer a possible response to the question of what an idealised language centre is like. It is pointed out by Kantz & Kahn (1974) that human organisations, of which educational systems are a kind, are open systems in terms of their high sensitivity and receptivity, from their environment. According to General Systems Theory, it can therefore be argued that YADIM should operate on the basis of an open system which interacts with its environment, that is, the target faculties to which it serves as well as the related suprasystem, the society (Richey, 1986). Miller (1978) points out the importance of the relationship between the two systems, which is equally applicable to YADIM and its environment as follows:

> In order to survive, the system interacts with and adjusts to its environment, the other parts of the suprasystem. These processes alter both the system and its environment. It is not surprising that characteristically living systems adopt to their environment and in return mold it. The result is that after some period of interaction each in some sense becomes a mirror of the other.
> (Miller, 1978:29-30).

Due to the relationship and interaction between YADIM and its environment, that is, the target faculties, there is a constant flow, inward and outward, of input and output of students between the system and the environment. The environment provides the input, that is, the new members, entering the system. The target faculties receive the products, the outputs of YADIM, who after graduation become functioning members of the society and thus influence

the operation of the suprasystem, the society. The process of transformation of learners which starts at YADIM and terminates at the TDC would help the young generation of Turkey to become future members of the society, taking place in various sections from banking to research institutes as well as in the international scientific communities.

In order to provide information about the output of the language centre a feedback system can be integrated into YADIM by collecting information from the environment about its output. This feedback mechanism needs to be both dynamic in nature, as well as serving the foundation of the instructional design. The information from the target faculties concerning the needs and expectations of the members, i.e. the lecturers, requires collection through co-operation between the centre and these disciplines, it then needs to be analysed and converted into a valuable form for effective instructional planning (Barnett, 1992). This feedback mechanism is one basic feature of the open system, related to the information about the input from the environment to the system as a signal about the functioning of the system in relation to its environment. YADIM with the dynamic and two way feedback system would become a more feedback sensitive system, in relation to the lecturers' expectations and requirements as well as monitoring learners' performances while they are receiving the transformational process in the target faculties.

This dynamic feedback mechanism in the idealised language centre needs to be integrated into the system by a two-way feedback loop illustrated by the figure on the next page. (See Figure 2.1). The figure also illustrates the interdependence between YADIM, English-medium TDCs and the society as an idealised model.

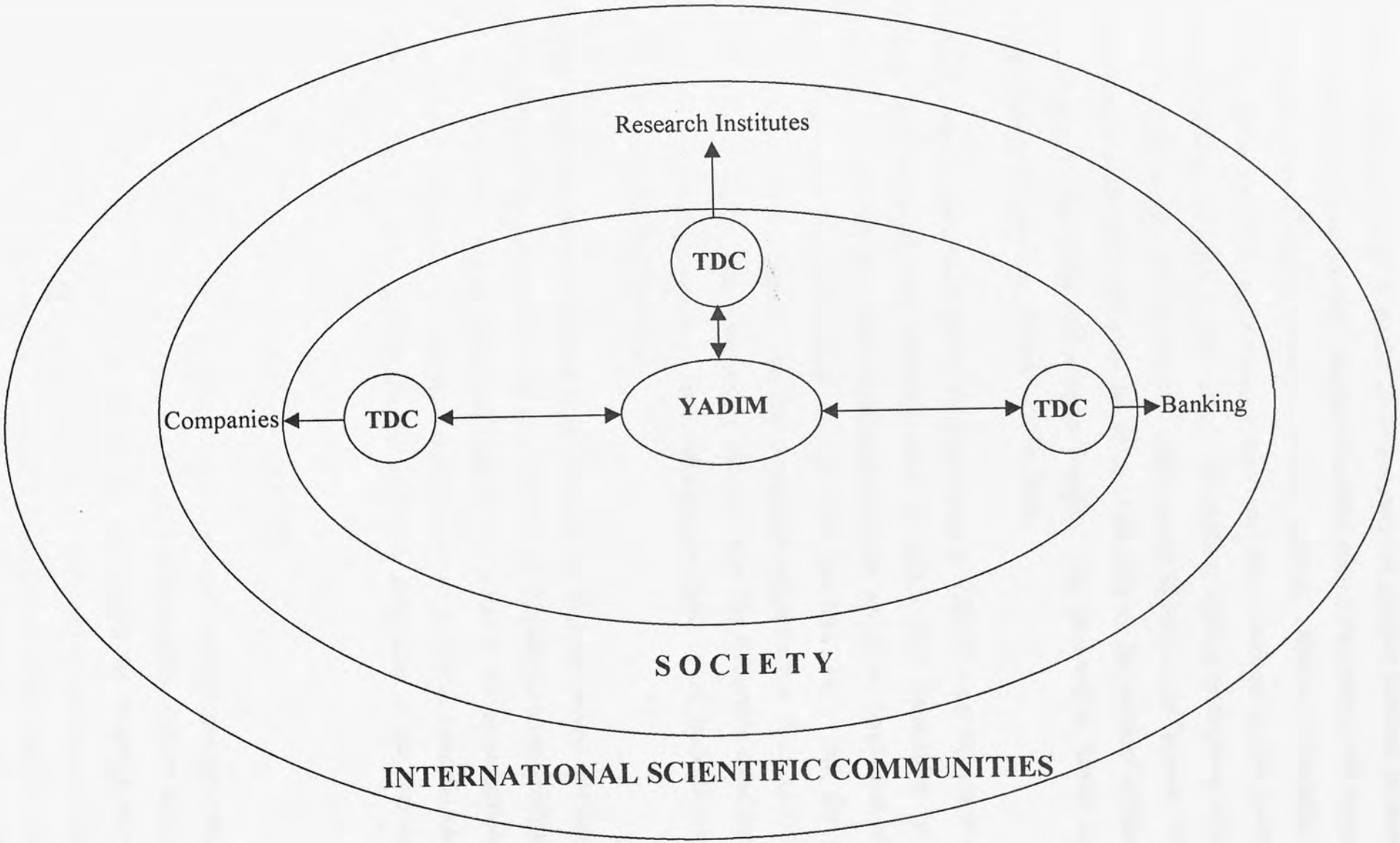


Figure 2.1 The Interdependence Between YADIM, TDC, Society and International Scientific Communities.

However, feedback obtained from the target systems need not always be positive feedback. As argued by Richey (1986) "it should not be assumed that positive feedback is desirable and negative feedback is to be avoided. Negative feedback allows the system to be maintained on course and attempts to sustain a constant product" (Richey, 1986:16). Similarly, it would help YADIM, as a system, to re-organise itself and also contribute to the quality of the education provided. In addition, the assumed definition of quality, proficiency, efficiency in terms of YADIM should underlie students' performances in their target faculties. The output of the system's quality and efficiency should be measurable by the students' efficient access to domain-specific knowledge in their target faculties. This issue will be further explored in the Methodology Chapter (see Chapter 5) of the study.

Due to the reasons mentioned above, the programme at YADIM must be able to equip the members with necessary and sufficient skills to enable their functioning in the new community and provide favourable circumstances under which the acquisition of domain-specific knowledge can be fostered so that new members' entry into the respective communities can be facilitated. The above argument suggests that attaining efficiency in English-medium Higher Education largely depends upon the favourable conditions that are provided by the language centre to meet the language needs of the students prior to their initiation into their academic studies.

The justification for such an idealised model between the language centres and the TDCs can also be related to the major aim for the establishment of language centres which lies beyond providing merely the training of general English. As stated in the promulgation, language centres are established for the purpose of enabling learners to access scientific knowledge in their academic discipline. To achieve this objective, integration of the two communities appears necessary.

2.5 The Changing Nature of the Language Policy

Unfortunately, the government has not adopted a consistent language policy towards English-medium instruction in Higher Education in Turkey. When English-medium education started to be applied in the departments, it was decreed in the policy that attending the university's language centre be compulsory for all the new students whose language proficiency is not adequate to follow English-medium lectures at undergraduate level and therefore English-medium instruction be compulsory for all students of the related departments, offering partly

or fully English-medium instruction in order to follow their subject courses. This period coincided with the time when the present research was initiated. Since then, there have been several changes in the language policy; with a new regulation proposed by YÖK in 1994, attendance at the language centre was made optional, as a result of which English-medium education in the related departments was made optional, too (YÖK's new regulation published in the Official Gazette dated October 7, 1994, no:22074). Hence, prospective students of English-medium departments had a choice to make; they could attend the language centre if they wished and take the subject courses that are offered in their departments in English the following year provided there were a sufficient number of students who could form a classroom. Alternatively, they could commence taking their subject courses in L1, i.e. Turkish, their native-tongue immediately without attending the language centre. The decision depended upon the students' personal preference. It has been found that in the academic year 1998-1999, out of 41 students who were accepted to the Department of Civil Engineering 16 attended YADIM. In the Department of Textile, out of 21 students admitted to this department, only 7 attended YADIM. An informal talk with these students showed that despite their being aware of the fact that the following year they would be having no English-medium courses taught in their departments, they chose to attend YADIM in order to learn English.

Following such a decision by the Engineering Faculty Board March 26th, 1997 (Meeting No:9777, the Department of Civil Engineering), the Department of Architecture, the Department of Textile and Geology within the Faculty of Engineering and the Department of Mathematics, Physics and Chemistry within the Faculty of Science and Letters adopted the new policy of offering optional courses. Furthermore, the departments of Electrics-Electronics and the Mechanical Engineering continued with full English-medium instruction.

In the case of DECOBA, the situation was different. The YÖK's later proposal for the prospective students of DECOBA decreed that attendance at the language center be compulsory (published in the Official Gazette dated 16.5.1996 no: 889-817). Consequently, a preparatory year for the students of DECOBA became compulsory starting from the academic year 1996-97.

A new regulation later decreed that those who attend the language centre but are unsuccessful at the end of the year can be registered to the first year university undergraduate courses at DECOBA and continue their university education in Turkish (published in the Official

Gazette 16.10.1996 and no:2106). At present, within Çukurova University only the department of Mechanical Engineering and the Department of Electrics-Electronics are fully English-medium, while the remaining afore-mentioned departments offer partly English-medium instruction, provided they possess sufficient number of students who have successfully completed YADIM.

The change of decision in the English-medium university education described above seems to point to certain difficulties in the existing system. Part of the problems could be attributed to the lack of infrastructure facilities in the departments, that is, an inadequate number of lecturers who could offer subject courses via English and a paucity of library facilities as stipulated by the YÖK. Secondly, within the programme at YADIM there needs to be a close relationship between the language and culture of the TDC which is called for by the promulgation but not fully catered for. Hence, it is not possible to expect any growth at the level of knowledge acquisition nor in the development of concept itself in the way these concepts are mutually agreed upon by the members of the TDC (described in further detail in Chapter 3). This particular problem results in inefficiency in the acquisition of domain-specific knowledge which leads to learners' poor performance in conducting various reading-related academic tasks in their TDC.

An informal interview conducted with a senior lecturer in the Civil Engineering Department stated that students, particularly in the earlier stages in their academic courses, experience difficulties in understanding professional literature in their field of study through L2. The same lecturer acknowledged the importance of learning English for reading articles and publications, for the accessibility to the latest developments in one's related specialism, although he suggested that the purpose of the university education is to acquire professional knowledge. A similar complaint was articulated by the Head of the Economics Department (see Chapter 1).

2.6 Summary

This section has proffered a picture of the social background to English-medium instruction in Higher Education in Turkey with a particular reference to Çukurova University where the present research has been undertaken. It has been highlighted that there have been several changes in the government's policy concerning English-medium instruction in Higher

Education in Turkey due to the existing lack of facilities and insufficient provision at the language centre and the departments providing English-medium instruction.

Our first research question which asks "How can one, in practice, go about establishing prerequisites, *sine qua non* conditions of knowledge acquisition and concept formation via L2 in a Turkish university?" presupposes theoretical concept of discourse community with its implications to establishing a community of learners whose acquisition of domain-specific knowledge via L2 could be facilitated prior to their becoming members of their faculty in the context of Turkish Higher Education so that the problems highlighted in the preceding chapter could be minimised.

Our second research question which asks "How can one best arrange to make visible what is going on in the learners' minds?" presupposes theoretical concepts related to knowledge acquisition. Before developing an empirical research project that would enable knowledge acquisition and concept formation through L2, it is important to investigate literature in terms of these theoretical concepts which will then provide a framework for the development of the methodology. However, before dealing with the first research question, we find it extremely necessary to tackle the second question first, in the next chapter of the thesis, taking into account the natural development of our study.

CHAPTER III

KNOWLEDGE ACQUISITION

3.0 Introduction

The theoretical framework of our research is developed around two interrelated concepts: mental representation of knowledge and related issues, and the notion of discourse community. This chapter which lays the first theoretical foundation of our study, gives an overview of some selected theories concerning the structure of knowledge in mind, as discussed in the literature. It deals with the notion of knowledge and with the notion of concepts, as well as with the relationship between knowledge and concepts; the mental representation of concepts based on schema, frame and script theories and a discussion on learning versus acquisition. A short review of learning theories is followed by investigating the role of collaboration in the acquisition process. The chapter further explores views towards accessing written information. The processes involved in converting input into knowledge structures are tackled and the question of how cognitive processes can be analysed from a dynamic dimension and how the acquired knowledge can be determined from a static view are addressed. Finally, learning strategies are outlined and common points and differences between analogical and metaphorical reasoning are dealt with.

3.1 What is Knowledge?

Psychologists, in general, have referred to knowledge as "information that is represented mentally in a particular format and structured in some manner" (Eysenck & Keane, 1990:248), and used knowledge and information quite interchangeably (Carley, 1986). In addition to this, knowledge can also be considered as the outcome of learning. It has generally been accepted that a close relationship exists between knowledge and concepts (Kintsch, 1974; Sager, 1990) due to the fact that concepts are elements of knowledge and they package information. In order to describe this relationship, first we will review theoretical views as to what a concept is, then deal with the relationship between knowledge and concepts.

Describing what a concept is and how it is represented in the human mind has always been a difficult issue for researchers. Thagard (1996) in his review of concepts states that concern with the role of concepts in knowledge goes back more than two thousand years to the Greek philosopher Plato, who pointed to the difficulties of defining concepts such as "justice" and

"knowledge". Plato believed that knowledge of such concepts is innate and what education does is to remind us of the essence of these concepts. Similarly, later philosophers such as Leibniz and Descardes contended that the most important concepts are purely in the mind. Other philosophers such as Locke and Hume argued that concepts are learned through experience by encountering a variety of examples of the same concept. Although philosophers maintained that most concepts are largely innate, most cognitive scientists today are interested in the processes by which concepts are learned from experience and from other concepts.

It is generally accepted by some linguists (Lyons, 1977) that concepts are mental constructs, by means of which the mind apprehends or comes to know things. To Kintsch (1974), however, concepts are abstract entities that may be expressed in surface structures as words or phrases. This idea has been confirmed by Sager (1990) who made a statement in connection between linguistic symbols and knowledge that "linguistic symbols are not items of knowledge, except in the trivial sense that we are able to memorise their form; they are merely labels through which we can refer to knowledge" and he further added that concepts are "a unit of knowledge and they are elements in the structure of knowledge and as such have an important place in the philosophy of science and in theories of cognition" (Sager, 1990:15). Contemporary cognitive psychologists, too, consider concepts as mental representations or symbols (Carey, 1991). Similarly, Hudson (1995) maintains that words are used as labels for concepts. The view that concepts are encoded in words was expressed long ago by Piaget who stated that "a word is little more than a name for a concept, a simple token, in other words that can be easily acquired by a speaker when needed to express a corresponding idea" (Piaget, 1967:377).

Blumental looks at concepts from a psychological point of view stating that concepts are psychological events, a mental process and points out that "concepts are not always found ready made; they are usually the constructive achievement, or invention, of the perceiver or hearer" (Blumental, 1977:149). Cognitive psychologists claim that a word is introduced with a corresponding concept (Hatch & Brown,1995; Thagard, 1996). Hatch & Brown (1995:151) for example, point out that "concepts are not words and the actual words are viewed as instances of the concept".

The argument presented so far seems to point out that there is an association between concepts and lexis due to the fact that concepts are encoded in lexis. To Thagard (1996),

people acquire new words and the corresponding new concepts and in language concepts are represented by words but he further points out that not all concepts need have words that describe them, but there is a close correspondence between words and many of our concepts. Studies concerning how lexis, an important component of knowledge, is represented in the human mind has important implications for knowledge acquisition. Several metaphors are used to describe the organisation of the mental lexicon in long-term memory. McCarthy (1990), for example, likened the mental lexicon to a dictionary and to an encyclopaedia to stress the dynamic nature of the mental lexicon.

The dictionary metaphor implies the notion that a word and its meaning are written in together, and this information can be searched quickly for meaning of a given form (McCarthy, ibid.). Aitchison (1992) referred to the human word-store as *the mental lexicon,* yet she distinguishes a human's mental dictionary from a book dictionary pointing out that the former is "large, complex and dynamic in nature in that it constantly receives new input from environment which has to be integrated into the existing store of knowledge" (Aitchison, 1992:10). What is particularly crucial for knowledge acquisition is the *encyclopaedia metaphor* which suggests that words carry with them crucial links with other types of knowledge, including historical, perceptual and social knowledge. McCarthy (1990) illustrates this as follows:

> Cognitive processes connect with the encoding and decoding of words, take us far beyond semantics and into encyclopeadic knowledge and its relationship with the pragmatics of situations in which concepts are used. Language use involves cognitive activity; meanings emerge from the words in use and are created in the mind by elaborate acts of relating and matching different kinds of knowledge. Much of our knowledge of words is more like the kinds of information found in encyclopaedia rather than dictionaries or thesaurus.
>
> (McCarthy, 1990:47).

It is clear from the above quotation, the encyclopaedic nature of lexical knowledge brings with it association of concepts and may provide a series of links between words and an individual's encyclopaedia of world knowledge gathered over many years and his/her past experiences. Thus, associating words with certain types of knowledge involves more than using semantic information. "Encyclopaedic knowledge relates words to the world and brings in opinions, causes, effects, histories and context" (McCarthy, 1990:41).

The next issue which held researchers' interest was the acquisition of words, and of the meanings and concepts they designate or convey. Concepts, as well as becoming a concern of the philosophers and the linguists as described above, have received close attention from

psychologists, as well. Concepts for Carroll (1967), are "properties of organismic experience -more particularly they are the abstracted and often cognitively structured classes of "mental" experience learned by organisms in the course of their life history and concepts acquire names, that is, words or phrases in a particular language" (Carroll, 1967:569). Carroll further stated that many words or higher units of the linguistic system come to stand for, or name, the concepts that have been learned. More specifically, the word is paired with a concept as an experience.

It is the notion of *experience* which is particularly crucial in acquiring the meaning of a concept. It is not the purpose of this research to go into detail as to what meaning is, but we limit ourselves to how meaning of a concept can be acquired. As stated by Carroll above and elaborated by Roe (1998), we will consider meaning as *the area of shared experience* which is triggered by the word. Since the main objective of our study is to facilitate the acquisition of knowledge and concept formation we would then raise the question of "to what extent can neophytes share the experience of a word(s) pointing to concept(s) in the way it is shared and conceptualised by the expert members of the TDC?". Acquisition of concepts would then involve getting an approximate match between concepts that occur within a particular discipline and the way these are understood and interpreted by the members of the TDC.

A further related point is that concepts, as stated by Thagard (1996), embody or package information and consist of slots. Acquiring the meaning of concepts would then involve filling in each of the slots with information which Thagard (ibid.) illustrates with the example of "course" consisting of slots such as room, meeting time and kind of course. In the case of domain-specific knowledge, the acquisition of concepts and thus related slots need to be filled with values or information commonly agreed upon by members of the community.

It is right to point out that acquisition of knowledge entails acquisition of new concepts. Thus, acquisition of domain-specific knowledge would naturally entail acquisition of concepts that exist within that specific domain.

The purpose of this section has been to illustrate how concepts are viewed by the researchers, whereas the acquisition of concepts will be dealt with in Section 3.5. It can be concluded that concepts are abstract and complex entities, they are mental representations of knowledge, and are not necessarily associated with a single word; they may be *chunks of knowledge* and refer to *areas of shared experience*, and the acquisition of a word(s) bring(s) with it an association

of a concept. The next issue to investigate involves the mental representation of concepts, corresponding to words, thus mental representation of knowledge. In the mid-1970's psychological interest in the nature of concepts increased when researchers introduced new terms to describe the nature of concepts. In the literature on cognitive linguistics there is some variation in the researchers' use of the terminology concerning the mental representation of knowledge. The most frequently used labels to denote such mental constructs include schema, frame and script. In the following section, we explore some of the fundamental issues in the arguments concerning how knowledge is represented in the human mind.

3.2 Mental Representation of Knowledge

Since the 1970s, researchers working in the area of cognitive semantics (Radden, 1995; see Lakoff, 1987, 1990, 1993; Lakoff & Johnson, 1980; Kövecses, 1986 for their research on metaphor) and cognitive linguists (Aitchison, 1992; Langacker, 1992 and Winter, 1992 for their study on cognitive grammar) challenged many ideas about some fundamentally important aspects of the study of language. Cognitive scientists (Schank & Abelson 1977; Eysenck & Keane, 1990) agree that knowledge in the human mind consists of some kind of mental representation. They have mainly been concerned with the format that the mental representation of knowledge takes, how it is organised, how such knowledge develops and how it is used in understanding and processing of language. Many investigators proposed a variety of theories and models as the basic units of knowledge structures, including schema, frame, script, mental model (Johnson-Laird, 1983), and situational model (Kintsch & van Dijk, 1978).

In the following section, we focus on three of the selected theories mentioned above namely, schema, frame and script as they represent concepts within a particular discipline and they have a particular relevance to the acquisition of domain-specific knowledge structures.

3.2.1 Schema Theory

The most commonly used mental construct to account for complex knowledge representation has been the schema. Bartlett is usually acknowledged as the first psychologist to use the term schema by which he meant "an active organisation of past experience" (1932:201). The term active was intended to emphasise the constructive character of remembering. This

constructive process is crucial as it uses information from the incoming discourse or information, combined with knowledge from the past experience related to the incoming knowledge to build a mental representation. The concept of schema is generally regarded as "a frame of reference that generates expectations about the incoming information" (Widdowson, 1983), "previously acquired knowledge structures" (Carrell & Eisterhold, 1988:76) and "an abstract knowledge structure already stored in memory functioning in the process of interpreting new information and allowing it to enter and become part of the knowledge store" (Anderson & Pearson, 1988:37). It is believed that the interaction of new information with old knowledge leads to comprehension and acquisition processes.

The major concern for psychologists was to specify how a schema is built up and how an existing one is used for communication as well as its structure and constituents. Rumelhart & Ortony (1977) highlight the main characteristics of schemata in terms of three main features. One of the characteristics is related to its constituent parts. A schema consists of component parts which are variously called "variables" (Rumelhart & Ortony, ibid.) or "slots" (Anderson & Pearson, 1988), which contain concepts or other sub-schemata. When the schema gets activated and is used to interpret some events the slots are "instantiated" or filled out with particular information (Anderson & Pearson, 1988; Eysenck & Keane, 1990). However, sometimes slots remain "open", in such cases the person needs to engage in inferencing, by assigning inferred values to variables or slots, which is known as the assignment of "default values" (see also Minsky, 1985) in order to instantiate the schema. Later, however, the process of activating subschemata may continue, modifying the original assignments of variables. This whole process is determined by the specific communicative task.

According to Rumelhart & Ortony (1977), the second characteristics of the schemata is in terms of relationships among other schemata, called subschemata which are represented within the dominating schema in which they appear. The activation of a dominating schema might activate its subschemata during the comprehension process operating as a kind of network. According to the analogy introduced by Anderson & Pearson (1988), a person has comprehended a given information such as information from a text when s/he has found a mental "home" for it, otherwise s/he needs to modify an existing mental home in order to accommodate that new information. Another important point highlighted by Rumelhart & Ortony (1977) is that the stored knowledge is a copy or partial copy of instantiated schemata, that is, what gets stored is not the input but the interpretation that results from the instantiated

schema and that "knowledge represented by a schema is not linguistic entities, but abstract symbolic representations, which may be used for understanding" (Rumelhart & Ortony, 1977:110). As a result of this, one's memory becomes a representation of 'interpreted input' rather than the input itself based on different types of context.

The final characteristics of a schema is related to the nature of knowledge. It has been agreed by researchers (Rumelhart & Ortony,1977) that a schema represents encyclopaedic knowledge and knowledge associated with concepts. Psychologists have used a useful analogy, Top Down (T-D) processing *(knowledge driven)* and Bottom-Up (B-U) processing *(input driven*) to describe the organisation of schema (Rumelhart & Ortony, 1977; Anderson & Anderson, 1978; Rumelhart 1980a). For a smooth understanding and acquisition of knowledge to take place both processes need to act simultaneously (Carrell et al., 1988; Carrell, 1984, 1988), leading to "interactive processing" (Flores & Schreuder, 1983), with the task related reasoning in which the task designated leads to initiating the two processes. When a mismatch is encountered between the B-U information and the T-D predictions, this might lead to misunderstanding of the incoming information. Rumelhart confirms this by stating that "as long as the incoming information being processed through bottom-up processing and the conceptual predictions being made through top-down processing are compatible we have a satisfactory interpretation of the text" (Rumelhart, 1980a:79).

Empirical research in the field of reading conducted by Carrell (1983), Coady (1979), Carrell & Eisterhold (1988), Johnson (1982, 1992) has demonstrated the importance of the facilitating effects of schema in English as a second (ESL) and English as a Foreign Language (EFL). Johnson's research (1982) has demonstrated that a text on a familiar topic is better recalled by ESL readers than a similar text on an unfamiliar topic. Other research by Anderson & Urquart (1988) highlights the advantage of possessing discipline specific knowledge, e.g. economics information on tests of reading comprehension. Thagard (1984) maintains that the availability of schema affects the speed with which items can be recalled from memory, helping new knowledge to be accessed easily. The present research confirms research findings of the above researchers. (See Chapter 6 of the thesis on the facilitating effects of domain-specific schema on the recall protocols of the enculturated learners).

Despite studies outlined above, problems remain, particularly concerning the actual structure of a schema. Further empirical research is needed to illustrate how changes are brought about

on the existing schema, particularly in the context of acquiring domain-specific knowledge, which the present research proposes to investigate.

Another theory which will be made use of in this study in connection with knowledge acquisition is the frame theory. The concept of frame is approached from various disciplines. In the section below, we draw upon linguistics, cognitive psychology and conversation analysis which involve frame theory.

3.2.2 Frame Theory

Frame theory, originally proposed by Minsky (1975), offers a useful theoretical suggestion concerning how knowledge might be organised and processed. A frame representation is taken for a number of influential ideas, knowledge representation, information processing and reasoning processes. A frame interpretation, according to Fillmore (1976:26), represents "a kind of outline figure with not necessarily all of the details filled in" and to Minsky (1980:1) it is a "data-structure for representing a stereotyped situation" like being in a certain kind of living room.

Minsky's point of departure in illustrating frame theory is based on a visual perception that explains scene analysis largely in terms of discrete and symbolic processes as in the experience of seeing a room.

> When we enter a room we seem to see the entire scene at a glance. But seeing is really an extended process. It takes time to fill in details, collect evidence, make conjectures, test, deduce, and interpret in ways that depend on our knowledge, expectations and goals. Wrong first impressions have to be revised. Nevertheless, all this proceeds so quickly and smoothly that it seems to demand a special explanation. (Minsky, 1975:214).

According to Minsky (ibid.), a large collection of frames is stored in permanent memory about a single topic and attached to each frame are several kinds of information, some of which is evoked when the situation arises, and each frame as in the room frame above, has obligatory elements such as walls, ceiling, etc. as well as some optional elements like decorations on the wall. As with schema, a frame consists of a network of nodes and relations. The top levels of a frame are considered as an essentially stable set of facts about the world and represent things that have a truth value about the supposed situation, as in the case of a typical house frame, which might also correspond to T-D processing in schema theory, while the lower levels consist of terminals which are "slots" which must be filled by

data or expressions, that is, "fillers" which may themselves be frames (Hayes, 1980:48), both terminals or slots consisting of sub-frames (Wilks, 1980). Slots can be instantiated by assigning values to them through a process of reasoning to instantiate an appropriate frame.

One aspect of frame reasoning is done by an inference and assigning a default value, which is a value taken to be the "slot filler" in the absence of explicit information. Hayes (1980) highlights the value of analogical reasoning (see Section 3.9.2 for detailed description) in this process as "one apparently central intuition behind frames is the idea of seeing one thing as though it were another or specifying an object by comparison with a known prototype noting the similarities and point of difference in filling-in-detail" (Hayes, 1980:51). From this perspective, schema and frame display similar characteristics in that they are both means of representing background knowledge which is employed when interpreting incoming information. What might be distinctive, however, is that as Bartlett (1932) highlighted a schema is active and constructive whereas a frame is characteristically a fixed representation of knowledge and as Charniak (1975:42) stated it is "a relatively static data structure about one stereotyped topic".

The quotation given earlier by Minsky (1975) in connection with the vision process would have implications for the acquisition of domain-specific knowledge associated with general, nonvisual activities and the written knowledge of a genre of a particular discipline. From a frame based point of view, acquisition of knowledge might imply choosing a frame from one's memory, collecting evidence from data to fill in details, assuming that the standard details are missing, making conjectures, inferring, testing and revising the initial assumptions until there is a match between new knowledge into the framework of what one already knows. Fillmore (1985) maintains that some frames are innate, in the sense that they appear naturally in the cognitive development of every human being such as the knowledge of features of the human face. Others, particularly domain-specific frames, need to be acquired through experience or a process of enculturation (see Section 5.8 for details).

Frames in semantics: The concept of frame was developed within the disciplines of linguistics and semantics by several studies by Fillmore (1976, 1977, 1985, 1986). Fillmore (1977) brings into focus a "frame-and-scene analysis" of language in linguistics. He uses the term *frame* for any system of linguistic choices that can be associated with prototypical instances of scenes and the word "scene" for "any kind of coherent segment of human

beliefs, actions, experiences or imaginings" (p124). Furthermore he maintains that people associate certain *scenes* with certain linguistic *frames*. He then shows how this approach to meaning is useful in the acquisition of word meaning. What is particularly crucial for the present research is the *scene* evoked in neophytes' mind as activated by a particular word, which is illustrated in the section on data analysis (see Chapter 6 for details).

In relation to language acquisition, Fillmore (1976) considers the evolution toward language in terms of a gradual acquisition of a repertory of frames, knowledge structures, which are codified in vocabulary and grammatical categories of language. From the conceptual perspective, he suggests that particular words are associated in memory with particular frames in such a way that exposure to linguistic forms in an appropriate context activates in the perceiver's mind the particular frame which in turn, leads to access to other knowledge structures that are associated with the same frame. In a later article Fillmore (1985:223) elaborates his earlier views and uses "special frame of reference" to refer to a structured background of experience or beliefs. According to this view, a word is introduced with a frame and behind a particular word is a complex interpretive frame which represents the particular organisation of knowledge standing as a prerequisite to understand the meanings of associated words. This proposal is illustrated with a semantic domain of economics connected with the commercial event as explained below by Fillmore & Atkins (1992).

The frame for a commercial event would have the form of a scenario containing the case roles that can be identified as the buyer (beneficiary), the seller (actor), the goods and the money; containing subevents within which the buyer pays the money and takes the goods and the seller surrenders the goods and takes the money (deed). According to Fillmore (1985; see also Fillmore & Atkins, 1992) the entire frame of a commercial event can be accessed by any one of the words related to this frame. The whole commercial event scenario is activated in the mind of an individual coming across and understanding any of the words *buy, sell, pay, cost, spend, charge*, etc. From this point of view, a close relationship exists between words and frames and the words which occur in a particular frame such as the commercial transaction frame above form groups which are "lexical representatives of some single coherent schematisation of experience or knowledge" (Fillmore & Atkins, 1992:72). Fillmore (1985) argues that a frame is used as a conceptual basis for a specific framework of knowledge, which holds word groups together as in the case of the commercial event frame above, and brings about "frame related words". He assumes that knowledge which underlies

the meanings of the words in a particular group is generally acquired together and therefore learning words together within the same frame would be more reasonable from the learners' perspective. As claimed by McCarthy (1990) earlier, words are linked to an interpreter's beliefs and past experiences. Frame theory takes a similar perspective, and in this respect frame interpretation can take on a much more encyclopaedic view of meaning and provides a conceptual basis for acquiring and interpreting a large body of lexical knowledge.

The notion of *culture* is another factor worth mentioning in relation to frame theory, as in the case of schema theory. As generally agreed (Goffman, 1974; Tannen, 1979; Brown & Yule, 1983), a frame is culturally determined and cultural background results in different frames and/or schemata for the interpretation of the same situation or event. It is particularly important to note that different cultures may have slightly different frames, perhaps not for the commercial event above but for others such as school, family, and these different frames need to be acquired with acquiring a foreign language or even acquiring domain-specific knowledge. Section 6.6 of the thesis reveals cultural frame of reference of Turkish students while acquiring domain-specific knowledge.

Frames in conversation analysis: The term frame is also used by conversation analysts (Goffman, 1975; Tannen, 1979). Frame analysis developed by Goffman (1975), from the conversational point of view, is mainly related to studying what is shared by the participants in a speech event and the overlap of the individuals' interpretation of a situation, which is not entirely compatible with Fillmore's concept of frame. Goffman (ibid.) pointed out that in any focused encounter a particular *definition of situation* comes to be shared by the participants. This serves to define what will be considered, for the time being, as relevant, as well as what is irrelevant so that utterances could be interpreted in accordance with the way in which they are intended.

The concept of frame has a *sharing* perspective as pointed out by Goffman (ibid.), which involves sharing the elements that occur within a particular situation, leading to a *shared frame of reference* between participants. A shared frame of reference is an important concept which will be investigated throughout the present research. Sharing *words* is not of much use unless participants also share an appropriate frame of reference to which they belong. In the context of acquisition of domain-specific knowledge within the discipline of economics and business studies, we will use *frame of reference* to refer to how close neophytes' (new members to DECOBA) interpretation of a particular concept is to an agreed definition by the

expert members of the target faculty, which include the lecturers. We will consider the economics and business studies as a macro-frame, under which various sub-frames exist such as *barter frame, commercial exchange frame, monopoly frame*, etc. Acquisition of domain-specific knowledge on the part of neophytes would therefore involve acquiring those sub-frames, as will be identified in the data analysis section of the study, in the same frame of reference as those members of the target faculty (see Section 6.1 for data analyses illustrating this point). Therefore, during the acquisition process, neophytes need to share the elements in those frames pointed by the words, and the frames of reference evoked in the minds of neophytes for a particular concept need to overlap with those of the expert members so that we can talk about efficient acquisition of domain-specific knowledge which is needed for an efficient communication to take place between both groups.

The final theory which deals with the acquisition of knowledge and with the question of how that knowledge is brought to bear in a given situation is the script theory, which is dealt with in the following section.

3.2.3 Script Theory

Script theory is concerned with the mental representation of knowledge which is organised around sequences of events like going to a restaurant or registering at a university, and their mental representations allow individuals to operate with facility when similar situations involving them are encountered. Schank & Abelson (1977:41) defined a script as "a structure that describes appropriate sequences of events in a particular context". To Abelson (1981:717), a script is "a hypothesised cognitive structure that when activated organises comprehension of event-based situations", and it consists of inferences about the potential occurrences of a set of events. A restaurant script, for example, has main components of entering, ordering, eating and leaving (Schank & Abelson, 1977). The main point highlighted is that the restaurant script establishes various expectations about typical activities in a restaurant from the customers' perspectives and once the mentioned script is active, the missing information can be inferred by the understander by a number of inferences.

Scripts, too, as in the case of frames, have cross-cultural differences and some scripts may exist in one culture but not in another. As in the case of frames, scripts specify concepts which activate lexical items associated with the concepts (Hatch & Brown, 1995). Hatch & Brown (ibid.) in describing the connection between scripts and concepts state that "you might

think of a script as a general prototype or template for an event. Concepts are part of the script for an event and vocabulary for the concept is 'activated' along with the script". (Hatch & Brown, 1995:145)

The original work on script-based knowledge proposed by Schank & Abelson (1977) has been found to be useful in situations when learners who have acquired a particular script in their mind can adopt it to a similar situation. As claimed by Schank & Abelson (ibid.), script based knowledge allows a person to "fill in the blanks" in understanding a text and do less processing when such frequently experienced events are encountered by matching what they see or hear to pre-stored groupings of scripts that exist in their episodic memory. However, script theory has also received some criticism from researchers. It was argued (Bower et al., 1979) that the individual script such as the one for eating in a restaurant was a fairly rigid structure and too inflexible to be able to cope with all variants of situations or novel situations. It has also been maintained that script, as in the case of schema and frame, might hinder planning in novel situations where existing knowledge structures do not fit new ones, especially when acquiring knowledge of a new discipline, as will be illustrated during the data analysis of the present research (see Chapter 6).

Script based theory would have implications for knowledge acquisition from two perspectives; one, during the knowledge acquisition process in which a particular word(s) point(s) to a concept which activate an event based situation in neophytes' mind, as in the examples of *solution script* (see data analysis of the debate on *fiscal* in Section 6.2.3). Another advantage of script theory concerning knowledge acquisition is that when a previously acquired script is encountered during accessing written knowledge, the newly encountered knowledge may fit under the relevant script, thus facilitating the acquisition process (see the written recall protocols of enculturated learners in Section 6.9.1.2). Learners with script-based knowledge were able to recall more of the textual knowledge in comparison with their counterparts with no prior script-based knowledge.

3.2.4 Contribution of the Schema, Frame and Script Theories to Knowledge Acquisition

In the previous section, we focused on schema, frame and script theories, knowledge organisation structures, which were developed by different researchers, all referring to the same phenomenon with some subtle differences between them and an overlap in what they describe. The main differentiating factor seems to be that the term schema is used to refer to

well-integrated chunks of knowledge about the world and is a complex unit of knowledge expressing what is typical of a group of instances, and is active and constructive, whereas frame is a relatively specific kind of a schema. Scripts deal with knowledge about sequences of events.

While differing from one another sometimes in important ways, there is general agreement that all theories show some similarities in their arguments in that knowledge is structured in the mind and is activated in communication process and there is interaction between existing knowledge in the mind and the incoming knowledge. Schema, frame and script are higher-order knowledge structures that embody expectations guiding lower order processing of the input (Minsky, 1975; Schank & Abelson, 1977; Abelson, 1981). Another unifying feature of these organisational forms is that they are incomplete and consequently they must be instantiated or filled-in by the incoming information during the comprehension process. The fact that they are culturally determined is another factor uniting these theories. Finally, the notion of *expectation* underlies these three mental constructs, in other words, "they are based on one's experience of the world in a given culture or a combination of cultures" (Tannen, 1979:138). Due to these reasons, these different terms, as claimed by Brown & Yule (1983) are best considered in the literature on cognitive psychology as alternative metaphors for the description of how knowledge is organised in memory and how it is activated in the process of acquisition and comprehension. These structures clearly exist in the context of wider modalling techniques of knowledge acquisition as discussed by McCloskey (1986) and Evans & Henderson (1990). As the focus taken in the research was a micro focus, it was decided not to explore the relationship between these modalling techniques and our data.

For the present research, we will analyse our data in relation to these three concepts described above. Our working definitions of these concepts will be as follows:
We have decided to use *schema* for general knowledge structures and learners' existing knowledge structures concerning a particular concept, *frame* for the more precise knowledge structures, and reserving *script* for knowledge structures involving sequence of events, as will be illustrated in relation to the data analysis in Chapter 6 of our study.

The preceding section has focused on the mental representation of knowledge and concepts. Another fundamental issue in relation to our research question is how knowledge acquisition occurs. Before discussing this issue, it seems crucial to review the literature in relation to what acquisition is. Thus, the next section is concerned with the theoretical views concerning

learning and acquisition and then it discusses theories to learning and investigates which particular theory is conducive to the acquisition of domain-specific knowledge.

3.3 Learning versus Acquisition

The distinction between two kinds of knowledge phenomenon, i.e. learning and acquisition, is initially based on the work of Krashen (1976, 1981, 1982) in relation to second language acquisition (SLA). Acquisition, to Krashen (1976), consists of the spontaneous process of internalisation of rules underlying the target language that results from natural language use, while learning consists of the development of conscious knowledge of the target language through formal study. In other words, learning is used in the sense covering learning in formal context, while acquisition takes place in an informal context. Consequently, the learned knowledge is considered always conscious, the result of study, and it can be planned while the acquired knowledge is one which learners have had but which they are not ordinarily aware of. It is unplanned and subconscious and takes place as a result of natural and largely random exposure to language.

Krashen (ibid.) considers the two terms denoting totally separate psycholinguistic processes operating in second language development. He claims that acquired and learned knowledge are stored separately; conscious learning does not aid unconscious acquisition and learnt knowledge cannot be converted into acquired knowledge and that conscious learning does not aid acquisition. He assumed that the learning process is triggered when there is a gap between a structure or form in input and the learner's current level of competence (Krashen, 1982).

Such a distinction has received both justification as well as criticism. It has been justified on the grounds that both conscious and unconscious learning can take place in learning a foreign language (Lewis, 1993). However, what is contentious about Krashen's claim is that the two are considered totally unconnected. Another criticism raised against such a dichotomy was related to its unscientific nature and it was claimed that learning can be tested whereas acquisition is not susceptible to empirical testing (Lewis, ibid.). A further point of criticism raised by Faerch & Kasper (1986) is that Krashen does not say much about the processes leading to learning itself. They argued that "positing two types of learning, acquisition and learning, has little explanatory value without some detailed specification of the assumed differences between the two" (Faerch & Kasper, p:46). Moreover, Krashen's view of

acquired and learned knowledge being stored separately has not yet been proved and tested by empirical research.

While Krashen appears consistent in his use of the two terms, they are used more loosely by other researchers to describe how languages are learned and no harmony seems to exist among linguists' definition of these terms. Some researchers heavily make use of learning, while others use acquisition or use these terms interchangeably. Researchers admit that such a distinction may exist, yet they have not come up with a satisfactory differentiation between them, so their use of these terms seems to overlap. Although all these researchers (Faerch & Kasper, 1986; Lewis, 1993) and some others appear to want to understand how knowledge is acquired and provide much information on conditions that facilitate acquisition of knowledge, there are very few explicit attempts to propose a model of how knowledge is acquired, that is, how changes in the knowledge base are brought about. Moreover, the traditional distinction made by Krashen, despite having some truth value in that acquisition takes place as a result of natural exposure to language, remains quite inadequate in answering the questions in relation to the acquisition of domain-specific knowledge. There is now a growing tendency to utilise the term acquisition without explicitly defining what it is and the circumstances under which it might be promoted.

Rumelhart & Norman (1978:37) suggest with their work on semantic memory that the study of learning has been slighted and the term learning has fallen into disuse, replaced by vague references to "acquisition of information in memory". What is more, what remains highly controversial is the extent to which "the two kinds of knowledge interact with each other in the mind of the learner" (Lightbrown, 1985:179).

With the emergence of cognitive science in the 1980s, researchers have started to carry out studies on the acquisition of scientific knowledge (Norman, 1980; Carey, 1991; Stavy, 1991; Mason, 1994) and similar studies were conducted in the context of SLA (Wode 1981; Brown, 1989). Norman (1980) put forward the model of learning as illustrated by the following figure, which is proposed as a rough schematic representation of knowledge, in which all those brackets, pointed arrows, and ovals represent the knowledge within someone's memory structure.

Figure 3.1 The Schematic Representation of Knowledge (Norman, 1980:44)

As shown in the figure, there is a gap and learning according to this view, is the "filling in of that gap" (Norman, 1980:39) first by acquiring the missing piece of information, then by neatly knitting the piece into the existing network of knowledge. Norman (ibid.) claims that acquisition of knowledge involves an active interpretation on the part of the student, who is likened to a theorist, building on incomplete evidence, tending to ignore information that does not fit his/her existing schema. It is also claimed that the student comes to the learning situation with a set of pre-existing knowledge, against which s/he can interpret the incoming information presented to him/her, in an active and constructive manner.

In fact, unlike Krashen who maintains that learning and acquisition are totally separate, what Norman seems to imply is that acquisition is a component of the process of learning. Channell (1990), in talking about vocabulary acquisition, refers to Krashen's distinction between learning and acquisition and notes that "I regard an L2 word as having been acquired by a learner when it can be first recognised and understood (rather than guessed at) and secondly used naturally and appropriately to situation". She also points out that "learning then covers all the strategies employed to lead to acquisition -it is the process, acquisition is the end" (Channell, 1990: 12). Glynn (1991:5) considers learning in terms of "the process of acquiring new knowledge". Likewise, Carbonell (1983) considers learning as the acquisition of knowledge stating that "when we say that someone learned physics, we mean that this person acquired significant concepts of physics, understood their meaning and understood their

Although the studies highlighted above have been beneficial in shedding light on the issue of what learning and acquisition might be, how knowledge of a particular discipline is acquired, particularly through L2, and the possible circumstances under which it is acquired remain largely unexplored research areas, which the present research aims to investigate. The following section is concerned with two types of learning, namely meaningful and rote learning. This distinction is assumed to highlight the significance of meaningful learning in the acquisition of domain-specific knowledge.

3.3.1 Distinction Between Meaningful and Rote Learning

The distinction between meaningful and rote learning was originally made by the psychologist Ausubel (1963) who argued that meaningful learning refers to a distinctive kind of learning when incoming ideas are related in a "nonarbitrary" and "nonverbatim" fashion to what the learner already knows, namely, to some relevant aspect of his/her structure of knowledge, that is, concepts, which are as stated earlier components of schema. If, on the other hand, a learner memorises the incoming information verbatim as a series of arbitrarily related words, both the learning process and the outcome result in rote and meaningless learning. In such a situation, neither the learning process nor the learning outcome can possibly be meaningful.

As stated in the above mentioned distinction, efficiency of meaningful learning can be attributed to its two distinctive characteristics; *the nonarbitrariness* and *the nonverbatim* nature of the learning which is highlighted by Asubel, below:

> It is the nonarbitrariness of this process that enables him to use his previously acquired knowledge as a frame of reference, for internalising of new word meanings, concepts and propositions with relatively little effort. The only way it is possible to make use of previously learned ideas in the processing or internalisation of new ideas is to relate new ideas nonarbitrarily as "wholes" to the established certain facts. (Ausubel, 1968:59).

When, on the other hand, learning material is arbitrarily related to cognitive structure, no direct use can be made of the established knowledge in linking it with the learning task. Ausubel (ibid.) defends this idea by saying that "because the human mind is not efficiently designed to interiorize and store arbitrary associations, this approach permits only a very limited amount of knowledge to be internalised and retained and only after much effortless repetition" (Ausubel, 1968:60).

3.3.2 Implications of Meaningful and Rote Learning

The crucial difference between meaningful and rote learning has important implications for the kind of learning and retention processes underlying each category of knowledge. Meaningful acquisition of domain-specific knowledge would have important consequences in enabling an individual to become a professional in his/her discipline and the academic achievement. This argument was confirmed by Ausubel who stated that meaningful learning is considered so important in the process of education,

> because meaningfully and rotely learned materials are learned and retained in different ways and that potentially meaningful learning tasks, by definition, are relatable and anchorable to relevant established ideas in cognitive structure and rotely learned materials are discrete and relatively isolated entities that are relatable to cognitive structure only in an arbitrary, verbatim fashion, not permitting the establishing of the relationship taking place in meaningful ways. (Ausubel, 1968:59).

Wittrock (1977; see also Mackenzie & White, 1981) in agreement with Ausubel defines meaningful learning as a "student generated process that entails construction of relations, either assimilative or accommodative, among experience, concepts, and higher order principles and frameworks" (Wittrock, 1977:261-62). It is the construction of these relations between and within concepts that produces meaningful learning. Meaningful learning has also been studied by Prawatt (1989), Mason (1994), and others. The results of their study confirm Ausubel's view that for meaningful learning to occur, new knowledge needs to be connected with prior knowledge. In this process, analogy is considered to be a powerful relation as it comprises a set of relations between the existing knowledge and features of the corresponding concepts; therefore via analogy it becomes possible to produce meaningful learning (see Section 7.1.5 for details).

Since the distinction made between two kinds of learning by Ausubel has also been confirmed by other educationalists, it is expected to see differences in the knowledge acquisition of learners who tend to learn meaningfully while others memorise the incoming information, as will be discussed in Chapter 6, on the analysis of the written recall protocols. Students at DECOBA, with no experience of previous domain-specific knowledge, tended to resort to rote-learning as they lacked a framework within which to fit new knowledge structures. On the other hand, those with prior domain-specific knowledge showed the opposite.

In the following section, we take a brief look at the theories of learning and highlight which learning theory would be conducive to the acquisition of knowledge.

3.4 Theories of Learning

In the literature on learning, two main theories are recognised, which are the transmission theory and the constructivist theory. The second one is of particular relevance to our research. In the following section, these two theories are discussed.

3.4.1 Transmission Theory of Learning

The transmission model to learning mainly corresponds to the traditional view. Jaeger & Lauritzen (1992a:5) define this theory as "teacher directed, ignores prior knowledge, depends on external motivation, and involves isolated skills teaching because the transmission model starts with the premise that the learner needs to know a certain piece of knowledge or skill, prior knowledge becomes tangential and unimportant". Due to this feature, the teacher acts as a dominant figure imparting knowledge while the students remain passive as the recipients of whatever has been taught to them.

3.4.2 Constructivist Theory of Learning

The notion of cognitive construction of learning dates back to the work of the psychologist Piaget (1967) who is considered as the most prolific constructivist. His theory of cognition can be interpreted against the biological and evolutionary point of view. For Piaget, adaptation is the major principle that operates in intellectual growth as in all biological development. Adaptation, as intended by Piaget is a term borrowed from the biology domain, is the state of an organism or of a species' ability to survive in a given environment. An organism in biology can actively modify itself and generate characteristics to suit a changed environment. Similarly, it is noted that a human cognition, that is, human intelligence has an *adaptive* function; it must adapt itself to the incoming knowledge structures by taking in, assimilating and converting them into mental thoughts by accommodating one's mental structures to new aspects of the environment.

Two major processes, assimilation and accommodation, constitute the basic concepts of Piaget's theory of cognition, representing complementary aspects of the general process of adaptation.

3.4.3 Assimilation and Accommodation

Piaget (1967) illustrates adaptation with the following analogy which results from both *assimilation* and *accommodation*. In the analogy involving eating and digesting an apple, one uses certain biological processes such as mouth, teeth, stomach, by means of which one takes in and converts the apple to a form which the body can use. In other words, the body has *assimilated* an external object and changed it into human biological material. Piaget believed that similar phenomena applied to mental activity, namely, individuals posses mental structures that take in or assimilate external information and convert it into thoughts or knowledge structures. *Assimilation*, as illustrated in this analogy, involves a gradual adjustment in one's conception, with each new adjustment laying the ground for further adjustments where the end result is a substantial reorganisation in one's central concepts.

Accommodation, however, a fundamental conceptual change, involves changes in one's assumptions about the knowledge structure, which occur when people are dissatisfied with their current concepts. For Piaget, the mind is organised in increasingly complex and integrated ways, which is similar to the notions explained in schema theory, and learning involves accommodating new constructs into older structures. To bring about conceptual change, learners need to be exposed to an environment of new experiences.

The views put forward by Piaget were also confirmed by other educationists (Hewson & Hewson, 1984:223; Driver & Bell, 1986; Watson & Konicek, 1990). In the context of SLA research, Blumental (1977) and several others put forward a similar argument to that of Piaget (1967) that acquisition is an organic growth without explicitly stating how it occurs. Therefore, it can be maintained that further research is needed to explicitly discover how this organic growth occurs, which the present study aims to investigate (see Chapter 7/Section 7.1.1 which discusses research findings in connection with this issue).

The implications of the above analogy in the area of knowledge acquisition is profound in that knowledge of the target discipline should be introduced to neophytes gradually so as not to upset the organism's natural balance and to allow the organism to gradually absorb, digest

and assimilate new knowledge structures and accommodate them into the existing conceptual base. Were we to introduce neophytes to knowledge at a much greater scale, this would be harmful and disturb the biological make-up of the individuals leading to alienation and lack of success. (See Chapter 5 on methodology, which describes introducing neophytes to knowledge of their target discipline).

The foundation of the constructivist theory was laid by Ausubel and Piaget and was developed by its followers. The proponents of a constructivist theory (Lockhead, 1985; Pines & West 1986; Driver & Bell, 1986; Wells, 1986; Finley, 1988; Brooks, 1990; Callison, 1991) view learning differently from the more traditional view of the *transmission* model of instruction, explained earlier. They believe that learners do not acquire knowledge that is transmitted to them; rather, they construct knowledge through the engagement of an intellectual activity. Within this *constructivist* perspective learners are postulated as building mental representations of the world around them, as summarised below:

> The learner is actively constructing knowledge rather than passively taking in information. Learners come to the educational setting with many different experiences, ideas and approaches to learning. Learners do not *acquire* knowledge that is transmitted to them; rather, they *construct* knowledge through their intellectual activity and make it their own.
> (Chailee & Britain, 1991:11).

Unlike the transmission model which is teacher directed, the constructivist perspective is based on student directed learning, views learners as the architects of their own learning and places the direct responsibility on the learners' active construction of ideas. According to this theory, prior knowledge of students is an important factor in constructing new ideas and frameworks that form the bridge to further conceptual change (Ausubel, 1968; Gergen, 1982; Pines & West 1986; Finley, 1988; Callison, 1991).

A primary tenet of the constructivist theory is that knowledge is the result of an individual construction of reality. While the traditional teacher centred classroom places responsibility on the teacher, the role of the teacher in a constructivist theory becomes one of facilitating, guiding and coaching, providing an environment and context for learning, and evaluating the learner's current state of knowing. The teacher who adopts a constructivist approach believes that knowledge cannot simply be transmitted to others for true learning to occur, rather, as stated by Padilla (1991) learners should be provided with experiences from which they could form their own active manipulations. This view was also acknowledged by Jaeger &

Lauritzen (1992a:13) who stated that "the teacher shifts from imparting a body of knowledge to helping children enrich and understand their personal lived-through experience".

A further benefit of the constructivist theory to learning can be related to its emphasis on meaningful learning which has already been highlighted in Ausubel's theory in the previous section. To constructivists, learning occurs with understanding in which a learner must actively construct meaning, making links between the existing knowledge and the incoming information, building on what s/he already knows and gradually elaborating one's conceptual framework.

We believe that acquisition of domain-specific knowledge lies not so much in the transmission theory as it does in the constructivist view. Thus, by choosing the above mentioned tenets to describe learning, we have aligned ourselves with a constructivist perspective in knowledge acquisition. The justification for promoting the knowledge acquisition process in a classroom setting by adopting the perspective of the constructivist theory is also embodied in the axioms below:

> I hear... and I forget
> I see... and I remember
> I do... and I understand.
> (Chinese proverb)

The first two lines in the above quote correspond to the transmission theory, while the last one to the constructivist theory of learning. The underlying notion in the above quote is that the learner will better understand, retain and acquire knowledge when s/he is given the opportunity to manipulate and build upon his/her experience. If new information must be acquired by individuals it must, according to Ausubel (1968) be integrated and reconciled with the existing knowledge, form a coherent set of structures that account for the individual's experience. The above argument is also consistent with Blumental's (1977) view to concept who maintained that concepts are the result of the constructive achievement of the individual (see Section 3.2).

As highlighted above, while acquiring knowledge, the existing knowledge base experiences a continuous change and modification. In the following section, we introduce a model which illustrates how developments occur in one's knowledge base leading to concept formation.

3.4.4 Extension of Knowledge Base

Michalski (1995) working in the area of knowledge acquisition, illustrates knowledge extension by means of a "trumpet model", which is based on the proposition that the meaning which is assigned to any given situation or a concept is the result of an interaction between the base knowledge, which is also referred to as schema, frame and script (see Section 3.2) and various inferences, T-D and B-U processing, as discussed in relation to schema theory, as well as the importance of the communicative task. He maintains that the individual concepts, the elementary components of our knowledge parallel such a two-tiered nature of knowledge as illustrated by the trumpet model, below:

Figure 3.2 The Trumpet Model of Inferential Knowledge Extension (Michalski, 1995: 128).

Michalski (1995) views knowledge acquisition as a combination of two components; the individual's knowledge base (the first tier in the model), that is, explicit knowledge structures

residing in memory, which consist of specific facts about the concept, and an inferential extension of the knowledge base by conducting various inferences, inductive, deductive and analogical reasoning, by means of which the knowledge base is extended or modified (second tier in the model).

In Section 3.2 of the thesis, a definition of concept was offered. According to Michalski, the meaning of a concept, is a dynamic structure built each time anew, in the course of an interaction between some initial meaning and various inferencing. Similarly, Toulmin (1972) used the "conceptual ecology" metaphor which provides a philosophical basis for understanding the nature of knowledge and covers fundamental assumptions about science and that of knowledge.

Michalski's view of concept formation can be related to Vygotsky's view who stated that "direct teaching of concepts is impossible and fruitless. A teacher who tries to do this accomplishes nothing but empty verbalism, a parrot-like repetition of words by the child, simulating a knowledge of the corresponding concepts, but actually covering up a vacuum (Vygotsky, 1962:83). This view of concept formation was also confirmed by Carroll who pointed out that "one necessary condition for the formation of concepts is that the individual must have a series of experiences that are in one or more respects similar; the constellation of "respects" in which they are similar constitutes the "concept" that underlies them (Carroll, 1967: 570).

According to Carroll (ibid.), one necessary condition for concept formation is to have *a series of experiences*. The learner must be oriented to and attend to the relevant stimuli in order to form a concept as the first prerequisite. She has pointed out that concepts are essentially classes of experiences which the individual comes to recognise as such, whether or not s/he is prompted or directed by symbolic language phenomena. It can thus be argued that it is essential to provide the necessary experiences so that knowledge acquisition and concept formation can take place, which is the subject of Chapter 5.

Reasoning, the processes by which people evaluate and generate logical arguments and decision making, are central intellectual abilities in the human cognitive repertoire (Anderson, 1990:290). Johnson-Laird & Byrne (1990), describe the necessity of deductive reasoning as follows:

In order to formulate plans; to evaluate alternative actions; to determine the consequences of assumptions and hypotheses; to interpret and formulate instructions, rules and general principles; to pursue arguments and negotiations; to weigh evidence and to assess data; to decide between competing theories; and to solve problems. A world without deduction would be a world without science, technology, laws, social conventions and culture.

(Johnson-Laird & Byrne, 1990:5).

Carrying out deductive reasoning involves determining what conclusion, if any, necessarily follows when certain statements are assumed to be true, whereas in inductive reasoning, "generalised conclusion is drawn from premises that describe particular instances" (Eysenck & Keane (1990:418). Analogical and metaphorical reasoning, as will be discussed in Section 3.9.2, are means for extending or deriving more knowledge from one's knowledge base. The role of the knowledge base in the above model has been considered an important element of knowledge acquisition. Popper, already in the early 1970s, in relation to the growth of scientific knowledge, stated that:

Knowledge cannot start from nothing -from a *tabula rasa* - nor yet from observation. The advance of knowledge consists, mainly, in the modification of earlier knowledge. Although we may sometimes advance through a chance observation, the significance of the discovery will usually depend upon its power to modify our earlier theories. (Popper, 1974:28).

Indeed, the acquisition of new knowledge from experience makes little sense without assuming some prior knowledge within which the new experience is interpreted; otherwise "the new experience will be unintelligible" (Vosniadou & Brewer, 1987:12). The importance of prior knowledge in learning has been demonstrated and it has been stated that learning occurs against the background of the learner's current concepts (e.g. by Bransford, 1979; Carley, 1986; Mason, 1994 and many other researchers).

From the foregoing discussion it is obvious that knowledge acquisition does not occur in a vacuum, that is, learners do not start their acquisition with "a blank slate" (Carley, 1986). They start with some knowledge, some set of preconceived notions that exist in their knowledge base, though this may be incomplete or inaccurate. The essence of this view rests on the assumption that "the brain is not a passive consumer of information, instead it actively constructs its own interpretations of information and draws inferences from them" (Wittrock, 1980:492). The knowledge base, that is, the individual's cognitive structure or schema, consists of a collection of facts known by the individual that would allow him/her to interpret any new information.

In the preceding section, we focused on the learning and acquisition dichotomy. We discussed the distinction between meaningful and rote learning and highlighted the implications of meaningful learning to knowledge acquisition. The section further provided a discussion on the learning theories and emphasised the role of the constructivist theory to knowledge acquisition. Finally, *the trumpet model* illustrating the expansion in the initial knowledge base, leading to concept formation was introduced. In the following section, we will focus on processes that bring about changes in one's existing schema leading to the acquisition of knowledge.

3.5 Processes in Knowledge Acquisition

The processes involved in converting input into knowledge structures lead to knowledge acquisition which occurs by a gradual extension and refinement of the existing knowledge structures. An early attempt to elaborate the processes involved in learning was made by Rumelhart & Norman (1978) who proposed three ways, namely accretion, tuning and restructuring, in which the existing schema can be modified by new experiences leading to the acquisition of general knowledge, which has also implications for the acquisition of domain-specific knowledge. The same proposal was elaborated in later works of Rumelhart (1980b) and Rumelhart & Norman (1981).

3.5.1 Accretion

Learning through accretion involves encoding and integrating new information into the existing schema by a process of matching (Rumelhart & Norman, 1978, 1981), that is, the gradual accumulation of knowledge into already established knowledge structures (Norman,1980). It has been stated by Rumelhart & Norman (1978) that learning by accretion is the most common and fundamental sort of the learning process and is the normal kind of fact learning. In this type of process, no fundamentally new schema is acquired and all learning takes place by matching the incoming information with some appropriate set of schemata to form a representation for the experience in which the new information is substituted for the slots in a general schema. As a result, an individual's knowledge base is merely incremented by a new set of facts, by making connections with knowledge that is consistent with that of the old knowledge. (See examples of accretion in Chapter 6/ Sections 6.2.2 and 6.2.3).

3.5.2 Tuning

Rumelhart & Norman (1978) describe learning through *tuning* as involving the schema evolution, that is, the slow modification and refinement of a schema by adjusting the parameters, determining its default values, or otherwise improving the accuracy of the schema so that it best fits the actual data. This process is regarded as a central mechanism in the development of expertise and in making this knowledge efficient -making it possible to go from the stumbling, struggling state of the novice to the smooth, practised skill of the expert. Norman (1980) states that it is not enough to understand the topic matter, it must be "tuned" so that it becomes available without mental effort.

In the learning of some complex subject matter, it is assumed by Rumelhart & Norman (1978) that the first step would be the accretion of a reasonable body of knowledge about a topic, followed by the creation of a new schema to organise that knowledge appropriately. Then, continued learning consists of further tuning of these schemata as well as continued accretion of knowledge and possibly creation of other schemata. An existing schema serves as the basis for the development of new knowledge by minor changes, *fine tuning* of their structures. Rumelhart & Norman (ibid.) restrict the use of the term tuning to those cases where the basic structure of the schema remains unchanged and only the slots within the schema are modified. These changes may take place by first improving the values in the slots of the schema to specify the concepts that fit slots with more accuracy. Second, determining the default values in which the specific values of the slots are discovered and added to the specification of the schema (see examples of tuning in Chapter 6/Section 6.2.2).

3.5.3 Restructuring

If the existing knowledge is inconsistent with the new knowledge to be learned it is simply altered, thus restructuring refers to "the process whereby new schemata are created" (Rumelhart & Norman, 1981). Restructuring occurs when new knowledge structures are devised for interpreting new information and for imposing a new organisation on the already existing schema, thus leading to changes in the interpretation and the acquisition of new knowledge. Restructuring initially requires some critical mass of information to have been accumulated; however, it is the ill-formedness or irrelevance of this accumulated knowledge that gives rise to the need for restructuring of the acquired knowledge, which then may go

through tuning whereby the knowledge structures themselves become highly refined and distinct concepts.

Unlike accretion and tuning, restructuring represents the most radical form of change in knowledge acquisition, which is brought about by individuals' realisation of the differences between their acquired knowledge structures and those of the ones accepted by more expert members, for example, members of a particular discourse community, as will be discussed in Chapter 6/Section 6.3.

Carey (1985) put forward the notion of "domain-specific restructuring" in her studies with school children learning science. She argued that developmental changes in children can be viewed as domain-specific theory change. According to this view, children begin with a theory like conceptual structures (naive psychology, naive physics), which through restructuring give rise to new theories like economics and a theory of heat. This type of restructuring is conceptualised as the product of the child's increased knowledge of a domain brought about by his/her experience. Carey's research has suggested two different interpretations of restructuring that can occur during learning: *weak* and *radical domain specific restructuring*. Weak restructuring involves the creation of new, high-order relations between existing concepts. She uses novice to expert shifts as an example of weak restructuring as in the case of the difference between a novice chess player and an advanced one, whereas radical restructuring involves a fundamental change in one's schema, similar to "a paradigm shift in the history of science experience" (Vosniadou & Brewer, 1987:62). Similar views of domain-specific restructuring have been proposed by researchers working in the area of science education (Osborne & Wittrock, 1983).

In her later study, Carey (1991) refers to the category of radical domain-specific restructuring as *strong restructuring* (or strong conceptual change) which occurs when the shift involves the acquisition of new concepts, and *weak restructuring* (weak conceptual change) which occurs when the shift involves the acquisition of knowledge that implicates only previously available concepts. She points out that the theory analogy contributes to the characterisation of strong conceptual change. If there are new rules in the acquired knowledge, then the person has undergone strong conceptual change, otherwise the restructuring is considered weak.

The distinction between weak and radical restructuring is an important one as far as the acquisition of domain-specific knowledge is concerned. Acquisition of domain-specific knowledge in neophytes can be considered in similar terms as a process of enriching, elaborating existing knowledge structures that gives rise to weak restructuring, as in the debate on *inferior goods* (see Chapter 6/Section 6.2.2 for details). In the case of *radical domain-specific restructuring*, neophytes are faced with major differences that existing conceptual structures cannot account for, only radical restructuring can account for the emergence of completely new knowledge structures out of the existing structures, as discussed in Section 6.3. In the present study, it has been found that analogical reasoning has contributed to both types of restructuring to occur. Chapter 6 offers further insights in this particular area of knowledge restructuring in the context of acquisition of domain-specific knowledge via L2.

While the preceding section focused on the processes involved in knowledge acquisition, the following section deals with three theoretical views concerning access to written information and highlights the relevance of work-embedded reading for the present study.

3.6 Access to Written Information

Various views have played a crucial role concerning the process of accessing written information, which appears in the form of work-embedded reading, critical reading and interactive reading.

3.6.1 Work-embedded Reading (WER)

Roe (1992) describes "work-embedded reading" (hereafter WER) as a reading strategy which involves reading non-linearly, that is, not reading the whole text, rather only the sections relevant for the learners' initial purpose, such as reading for particular concepts. In general, this type of information retrieval, as practised in L1., i.e. mother tongue, is associated particularly with the reader's purpose, such as reading for specific information in a newspaper article by scanning the article for the main information, etc.

WER is also practised in L2, in the context of retrieving written information in a second language situation, as in the case of the students at DECOBA, where economics is taught in English (see Chapter 2). It is associated particularly with the requirements of an academic community to perform identifiable procedural tasks. The interview and questionnaire results,

as discussed in Chapter 1, demonstrated that the reading style of the first year undergraduates at their academic community was WER, that is, they read mainly for the concepts, rather than reading the whole text. It was found that in the learners' target community, work-embedded access to information was initiated in response to a given task, as in preparing a project on a given topic, the completion of which requires a range of activities, such as reading for the major concepts, scanning the article for the main information, etc. This and similar reading-related tasks are initiated with a particular purpose which fills an "information gap" (Johnson, 1981) and is purposeful in nature, thereby stirring high motivation for the learners. In order to be able to perform these tasks, students need efficient access to the required specialised information in texts (Kırkgőz, 1995).

Some investigations have been carried out for the purpose of the tapping into processing strategies of expert readers in a particular genre, with particular relevance to WER. Such studies have revealed target like behaviour (Swales, 1990) or *in vivo*, i.e. the kind of reading situation which is investigated from within the community, a view which may be very different from those that might be anticipated that is, *in vitro* view, i.e. an outsider view of the reading situation without considering the insider view, in accessing the scientific knowledge. A particularly interesting research, reflecting the *in vivo* reading, has been done into that of expert strategies for processing research articles. Bazerman (1985) examined the processes used by seven research physicists via observation and interview and found that his subjects rarely read sequentially, but tended to look "at the introductions and conclusions and scanning figures to get a general idea what the writer was trying to do" (Bazerman, 1985:11). In this research, the interviewees stated that they used selective reading strategies in order to concentrate on what they considered to be "news" for their own particular visions of their research fields.

Huckin's (1987) study with six junior American scientists brings to light a comparable general strategy, which he states as follows:

> When I asked them to demonstrate how they customarily read a newly-published article in the field, they all displayed a reading pattern dominated by the search for new information. First, they read the title, then the abstract, then they look for the most important data usually in graphs, tables, drawings and other visual aids. Next, they typically read the results section. At this point, their reading pattern is varied, depending on how well they knew the topic and how confident they were of the scientific methods used. (Huckin, 1987:4).

Like Bazerman, Huckin suggests that scientists read journal articles in their speciality in such a way as to identify the most noteworthy information; he goes on to suggest that the scientist's strategy is actually quite comparable to the way people read the front pages of newspapers. He notes the parallelism between reading headline and title, abstract, main events and major findings, etc.

Bazerman, (1988), in describing the work-bound reading of physicists who are engaged in various types of reading, highlights the importance of *purpose* as the initiating factor for the task. He states that "in brief, there is a great deal of information available to the reader within the structure of a scientific text or an article. It is the purpose with which the reader moves through the information structure of the text that determines the information extracted" (Bazerman, 1988:18). It is this information together with the reading purpose that affects the matching up of the reader's knowledge with the reading task in hand.

As stated earlier (see Chapter1/Section 1.5.3), from the interviews and questionnaires conducted with the first year undergraduates (non-enculturated learners) within the context of our research, it is clear that these learners, as novice readers, practised WER in their TDC. What is common between the physicists in Bazerman's research and the non-enculturated readers within our study in their use of this reading strategy is the "purpose". Since WER is practised at DECOBA primarily so as to read mainly for the concepts, it is particularly crucial to establish conditions at the language centre where the acquisition of concepts in L2 could be facilitated. In order to achieve this objective, within the context of our research, the discourse community afore-mentioned will be extended to include the language classroom itself as a kind of community with its social constraints and language learning experiences. The classroom formed for this particular study will become *a replica of the target discourse community* at YADIM where the fundamental concepts of their discipline will be introduced to neophytes through a process of enculturation (see Section 5.8 for details).

3.6.2 Critical Reading

Integrating critical elements while accessing the written information has been explored by many researchers. Widdowson who views reading as an interaction of a reader with a text argues that "in this interaction the reader can take on either an assertive or a submissive position" (Widdowson, 1983:91). The same notion is explored by Wallace (1992) who defines critical reading as a "procedure for reading between lines or drawing inferences".

Though the position selected depends on the reader's purpose, Wallace (ibid.) argues that the reader is free to take up whatever position suits his/her purpose on the dominance/dependence scale, depending on the context of learning. He further claims that if the reader is too submissive, s/he may accumulate information without accommodating it into the structure of existing knowledge. If s/he is too assertive, s/he may distort the writer's intentions and deny access to new knowledge and experience. To Wallace, however, the submissive nature of reading can occur when the purpose is largely "information gathering in which the reader can submit to the superior knowledge of the writer" (Wallace, 1992:41).

Critical reading in relation to our context would mean that in ideal academic classes in the faculties, proficient readers, especially when they are in their second or later years of their academic training, are expected to evaluate text information, critically react to the text content in class discussion, compare and synthesise information from related sources of information, i.e. lectures, from their independent reading, etc. (informal talk with two faculty lecturers). "Critical thinking involves cognitive maturity in general, focusing mainly on relevant aspects of text processing, and involves analysis and synthesis of information" (Kırkgöz, 1993:29).

3.6.3 Interactive Reading

The basic assumption underlying the interactive view to a written text is that "the participants - writer and reader communicate through the mediation of text" (Tadros, 1985:1). This interaction is accomplished when an exchange of meaning or transformation of shared knowledge takes place between reader and writer. Widdowson (1983), however, views interaction as the process of combining textual information with the information the reader brings to the text. In this view, reading is a kind of dialogue between reader and text in which the reader, in addition to extracting information from the text, attempts to activate his/her knowledge of the language and the subject matter which in turn may be refined and extended by the new information supplied by the text. Nystrand (1986) considers reading as a process of "elimination". As readers progress through the text in an attempt to gain information, their initial expectations are progressively "set and fine-tuned" by such details as their identifying the genre, the subject area, utilising sufficient context to unfold meaning. It is true to point out that both types of reading mentioned above, namely WER and critical reading contain interactive elements.

In addition to the nature of reading explained in the preceding section, another essential ingredient for the growth of knowledge is *sharing ideas;* as well as collaboration which is also highlighted by the constructivist theory. The following section highlights collaboration and its contribution to the acquisition of knowledge.

3.7 Modes of Acquisition

One of the arguments in the literature has been related to different modes in which acquisition can be promoted; whether on an individual basis or collaboratively. To Thagard, knowledge "can be both private and public inhabiting the brains of particular thinkers, but also subject to inter-subjective communication and assessment" (1984:234). Carley (1986), a social scientist, offers insights into the *sharing* perspective of language and knowledge acquisition. In her study on knowledge acquisition, she identified two ways in which individuals can acquire knowledge; as independent discovery and via communication with other members. She assumes that knowledge acquisition via discovery is relatively rare compared to acquisition via communication in the context of acquiring social knowledge, which she describes as information which everyone knows, in other words, it is the social background knowledge. She points out that "the acquisition of knowledge and hence cognitive development, becomes a by-product of human interaction. The individual's cognitive structure is continuously constructed as the individual moves through a series of tasks interacting with other members communicating and hence gathering information. (Carley, 1986:381).

Interaction referred to above is related to an individual's interaction with other members of the society. Prawatt (1989) acknowledges out that during interaction with other members, verbalisation of one's thoughts is one of the best means for bringing up one's awareness and that of knowledge of something.

A further benefit of sharing one's knowledge with others during the acquisition process can be related to what was pointed out by Piaget (1967) who emphasised that much of our knowledge is tacit and speech provides a means of activating and bringing this knowledge to light, from the subconscious to consciousness. In agreement with this, Bransford et al., (1986) state that sharing ideas help learners foster reflective awareness "without this awareness, the knowledge is relatively inert". In a similar vein, the idea of collaboratively constructing knowledge is equally valid for domain-specific knowledge acquisition. Acquisition of

knowledge can be fostered when it is collaboratively discussed and negotiated among the prospective members of a particular discourse community through peer interaction.

The educational advantages as exemplified by co-operative learning in groups, are documented in the work of several researchers. Yager, et al., (1985), for instance, compared co-operative and individualistic learning situations and they were able to demonstrate that the quality of verbal interaction within the groups made a significant contribution to the efficacy of the learning and that the careful structuring of the groups, ensuring that all members were involved in a given task, had a positive effect on the retention of the information. Bruffee (1984) argued that collaborative learning may be distinguished from other forms of group work on the grounds that it organises students not just to work together on common projects, but more importantly to engage in a process of intellectual negotiation and collective decision making in an attempt to reach consensus.

The concept of *sharing*, highlighted above, is consistent with the constructivist theory. In fact, the proponents of the constructivist theory have suggested that learning is facilitated by sharing, in other words, by means of interaction with one's peers (Jaeger & Lauritzen, 1992b) and knowledge results from the dynamic interaction of people. This is the reason why constructivists have promoted "co-operative learning", a practise that lets two or three students discuss approaches to a given problem or a task, with little or no interference from the teachers.

In the following section, we introduce a model developed by Carley to illustrate acquisition of social knowledge and later provide our own hypothetical model which is an adopted model of Carley that aims to illustrate the acquisition of domain-specific knowledge.

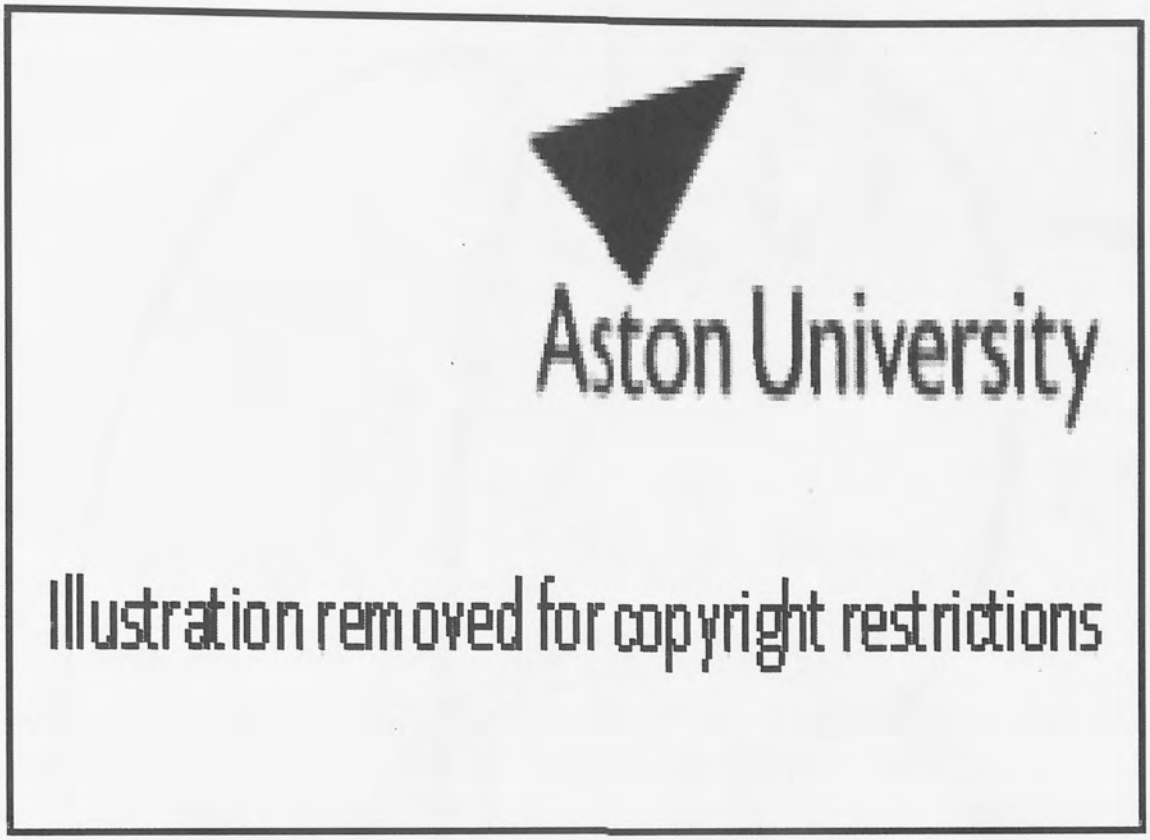
3.7.1 A Model of Knowledge Acquisition

Carley (1986) views knowledge acquisition as a social phenomenon. She developed a knowledge acquisition model based on the constructivist theory in which she stresses the social side and sharing element of learning with the goal of setting out an interrelationship between the social world and the individual's cognitive world, and then she explores this model relative to knowledge acquisition. She argues that social knowledge, which she assumes to be shared by members of the society, is necessary for interpreting communication, without such information the members of the groups would have no common base for discussion and agreement. According to this view, social knowledge can be used to help

establish the individual's frame of reference, his/her cognitive structure, which is then used by the individual to perform particular daily tasks such as selecting a president and interpreting questions on a test.

In the model on the next page, as illustrated in Figure 3.3, the individual is shown as a node connected to a set of other individuals by a network of ties. The social world is modelled as a holistic entity perceived as the patterns of network of ties between individuals. It is viewed as being composed of two parts - social knowledge and social structure. As individuals interact, they and the social world co-evolve. The individual's interaction propensity with the other members of the social unit and his/her cognitive structure or the knowledge base, as well as his/her motives and emotions constitute two defining characteristics of the individual.

As individuals perform tasks in the course of their everyday life, according to the model, they interact with others performing the same or different task, exchanging information, discussing and reaching a consensus, as a result of which they acquire new facts and new concepts. Carley (ibid.) assumes that the cognitive structures of the members of the society will become similar during the course of time as shared experience and interaction will lead not only to an increase in the individual knowledge base but also to an increase in shared knowledge. The degree of overlap, she argues, between an individual knowledge base and social knowledge shared by the members of the society becomes a measure of *socialisation*. This is shown by Figure 3.3 on the next page, which illustrates the social knowledge acquisition model of Carley (1986).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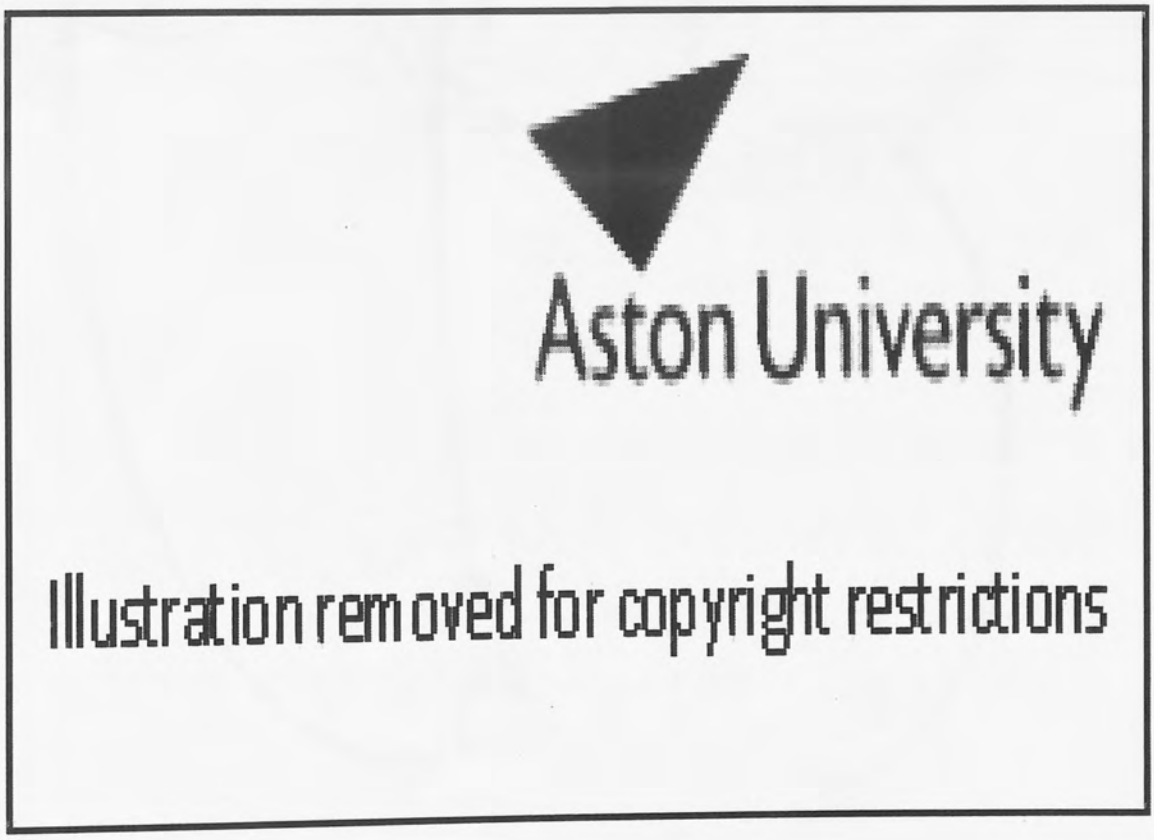
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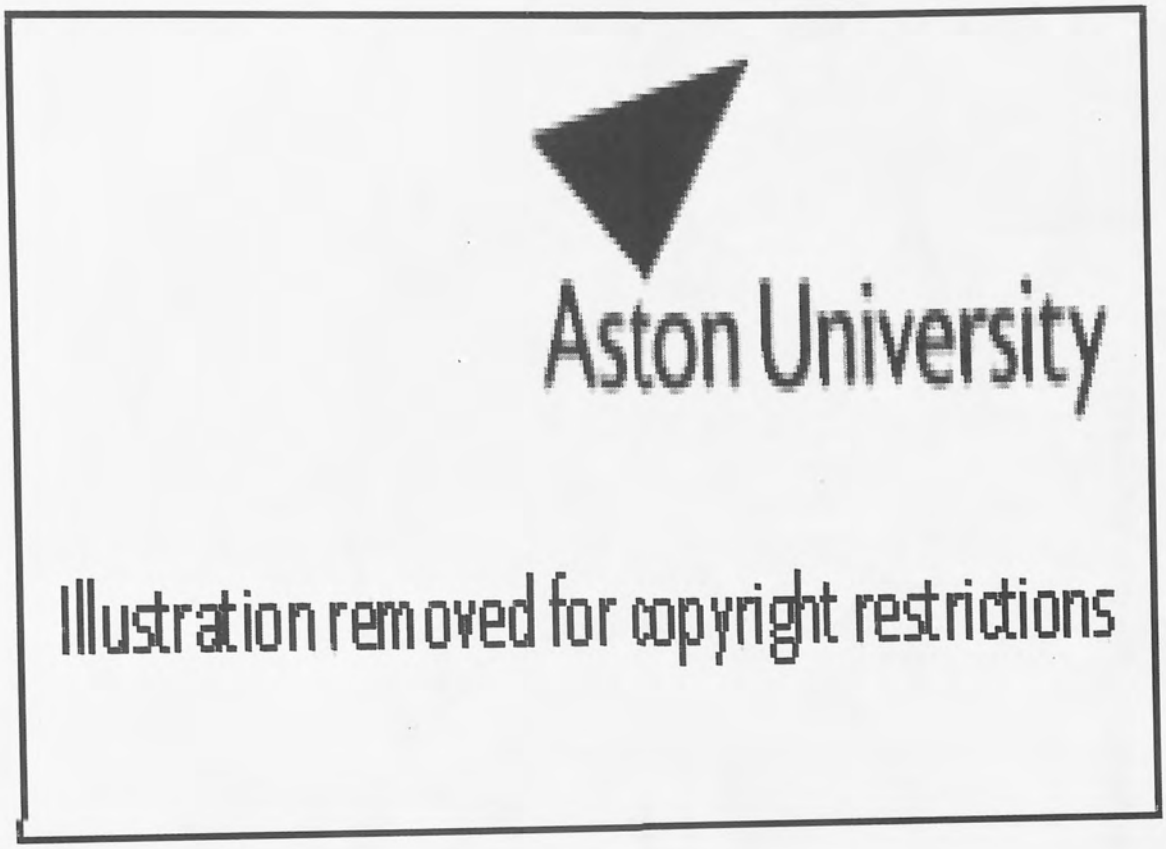
The model proposed by Carley has valuable implications for the process of acquisition of domain-specific knowledge, as will be illustrated in the following section.

3.7.2 A Model of Domain-specific Knowledge Acquisition

It can be argued that what Carley highlights for the acquisition of social knowledge is true for the acquisition of knowledge of economics and business studies. Against this background of information, we can argue that for neophytes as outsiders to their TDC, acquiring domain-specific knowledge and the relevant frame of references relative to the knowledge of their discipline is a gradual process. It can also be maintained that during the process of interaction with their peers, neophytes will experience some changes in their cognitive structures as they participate in performing knowledge construction activities, i.e. certain tasks, to be described in Chapter 6/Section 6.1.1. Such an interaction is expected to lead to a gradual shift from their general frame of reference to a domain-specific frame of reference, as illustrated in Figure 3.4 on the next page.

As in Carley's model, the individual neophyte is represented as a node connected to other neophytes by a network of ties, in our hypothetical model. The world of the TDC is modelled as a holistic entity composed of members - lecturers and economists, all of whom have attained shared understanding of the concepts and knowledge of their discipline. As neophytes interact with their peers on the basis of input derived from the TDC, their initial frame of reference which is expected to be in the nature of a social frame of reference, will experience changes thereby the world of the TDC gradually evolves, leading to a gradual acquisition of knowledge. The acquisition of domain-specific knowledge is expected to occur because all neophytes in the model simultaneously go through the process of interaction and the same set of tasks and they have high propensity to interact as they are all members of the same TDC.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It is also worth pointing out that the real context for acquiring domain-specific knowledge is DECOBA. The context in the above model is a generated one taking place partly at YADIM as a *replica community* and partly at DECOBA. The concept of establishing such a replica community will be dealt with in Chapter 5 of the present thesis.

In the hypothetical model, adopted from the social knowledge acquisition model of Carley (1986), and based on the constructivist view to knowledge acquisition, the neophyte has two defining characteristics that uniquely identify him/her *vis-a-vis* all the other individuals in this particular context. The first characteristics is his/her propensity for interaction with other future members of the faculty which derives from his/her willingness to be a member of a particular TDC with shared interest and shared purpose, as discussed in relation to Swales' (1990) notion of the discourse community. The second one is related to his/her cognitive structure, that is, the knowledge base, in the form of schema, frame or script. Admittedly, there are other factors that comprise a human being, such as motives, emotions, etc. However, within the context of the present research, our main concern is with these characteristics only to the extent to which they influence the acquisition process.

The process of collaboration and peer interaction is expected to lead to a situation where two or more prospective members have acquired shared meanings and shared definitions, thus a similar cognitive development with respect to the expert members of the TDC, as a result of performing the given tasks during the knowledge acquisition process. It can be assumed that the development of domain-specific knowledge will involve consensus among neophytes and occur as individual neophytes share facts in relation to domain-specific knowledge. In a joint endeavour, domain-specific knowledge is expected to become a by-product of interaction among the neophytes. It can also be argued that at later stages of the acquisition process, the knowledge base will indicate that shared experience and interaction during collaboration has led not only to an increase in individual knowledge; but to an increase in the shared academic knowledge, which can be defined as the set of facts members share by virtue of being members of the same community.

It has been argued in the preceding section, on the basis of the hypothetical model, that cognitive development at the individual level is the direct result, perhaps even a by-product of interaction among the prospective members of the TDC. During the acquisition of domain-specific knowledge through a foreign language, one of the speech activities that might occur

while collaborating with other members on the basis of the L2 input is *code-switching*. In the following section, we focus on how this speech activity is discussed in the literature.

3.7.3 Code-switching

While acquiring domain-specific knowledge via L2, neophytes will have to adjust to new knowledge structures and the nature of concepts established within the target community. As they negotiate with their peers, the language choice they make might shift between L1 and L2, by mixing the two languages in an attempt to accommodate new knowledge structures into their developing cognition.

Code-switching is a strategy that is generally recognised in the literature on bilinguals switchings between two languages in conversational interaction (Di Pietro, 1977; Gumperz, 1982; Romaine, 1989). It is used to refer to "moving from one repertoire to another, to the alternating use of two or more languages or varieties of language in the same speech event" (Mohd.Omar, 1996:78). Gumperz (1982:59) describes codeswitching as "juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or sub-systems". In the context of SLA, Corder (1978) has argued that code switching may involve varying stretches of discourse from single words up to complete turns. When code switching only affects single words, the strategy is referred to as "borrowing" (Corder, ibid.).

As the purpose of our study is to analyse processes taking place in knowledge acquisition via L2, it does not aim to provide a detailed analysis of this particular speech activity and therefore has limited itself to a brief description of this particular code and the role it plays in neophytes' acquisition of domain-specific knowledge. In the light of what has been discussed above, we consider code-switching as the insertion of one word or more from L2 into L1, and vice versa. When code-switching occurs during the process of knowledge acquisition, it may suggest neophytes' perception and assumption about the knowledge being acquired and their being quite in control of the knowledge acquisition process in either language. The data analysis section of the present research (see Chapter 6/Section 6.8) illustrates code-switching, as it occurs during the knowledge acquisition process.

In the preceding section, the major theories of learning were discussed and it was argued that the constructivist theory would be more conducive to acquiring domain-specific knowledge.

Moreover, a hypothetical model of knowledge acquisition was introduced based on Carley's model of the social knowledge acquisition. In the following section, we investigate the question of determining knowledge acquisition which would provide theoretical guidelines to analysing process and product dimensions in knowledge acquisition.

3.8 Determining Knowledge Acquisition

One of the difficult issues in SLA research has been determining what exactly has been acquired. In the classroom-based situation, various studies were conducted, tests were developed or response was elicited from the learners for this purpose (Seliger, 1983; Hammersley, 1990; Larsen-Freeman, 1997). Certain classroom learning situations are commonly designed around tasks, called task-based learning to trace developments occurring during the learning process or determine the end product of learning. This will be discussed in more detail in the following section.

3.8.1 Task-based Reasoning

Breen (1987) defines a *pedagogic task* as "any structured language learning endeavour which has a particular objective, appropriate content, a specified working procedure, and a range of outcomes for those who undertake the task" (Breen, 1987:23).

A pedagogic task, as assumed by the definition above, refers to a range of procedures which have the purpose of facilitating the learning process. Long (1985) suggests completing a form, whereas Breen (1987) considers problem solving and decision making as examples of pedagogic tasks. Similarly, acquisition of domain-specific knowledge could be planned around a structured activity, i.e. a range of tasks.

A pedagogic task consists of various components, as specified by English Language Teaching (hereafter ELT) researchers. According to Nunan (1989), each task contains four components: *a goal, input data, an activity* and *the role implied by teachers and learners.* In addition to Nunan's four components, Candlin (1987) adds a further component which is *the outcome of learning*. *Goal* determines the purpose for which the task is to be done, whereas *input*, in a pedagogic task refers to the data presented for learners to work on, linguistic or otherwise (Nunan, 1991; Lewis, 1993) and it contains the raw data which the learners are to work on in the process of acquisition. In relation to SLA, Wode (1981) states that the

language learning system is not a "self-initiating one", thus stimulation in terms of language data is required for it to be set in operation and learners need to take some "triggering" via language input for a language to be learned. In a particular pedagogic task, activities are set out so that learners can actually work with the input. The role of a teacher in a task-based learning is considered as monitoring and facilitating and the learner to actually conduct the task.

In addition to the components specified above, a pedagogic task could be approached from two more dimensions, namely, the process and the product dimensions. In language teaching, *product* is considered as any language which is created by the learners, that is, the outcome of learning, which is *static*. Similarly, to Lewis "product" refers to what the student presents "as a complete, finished whole for consideration and usually evaluation by the teacher" (Lewis, 1993:18). However, the product of learning, is created as a result of a process, which is *dynamic* in nature.

In the context of the present research, acquisition of domain-specific knowledge, more specifically, acquisition of concepts in the domain of economics and business studies, will be planned around particular tasks called task-based reasoning. It can be maintained that such a controlled planning might enable observing the developments and determining the product of what was acquired. Since our research primarily aims to trace the processes taking place in knowledge acquisition, a systematic framework needs to be established for this purpose. However, it can also be pointed out that the product of what was acquired can also be determined on the basis of task-based reasoning, this time the framework developed need not be as extensive as the one involved in investigating the processes. Analysing the process and the product dimensions of knowledge acquisition through task-based reasoning will be dealt with in more detail in Sections 3.8.2 and Section 3.8.3, respectively. However, in the following section the components of a particular task, as applied to our study, will be discussed.

Input in our research will be provided with the concordance citations of the key words representing important economics concepts, one concept at a time, with the aim of supplying the initial seeds for the development of domain-specific knowledge (see Appendix III for some concordance lines). *The purpose* of each task for neophytes is to reach the shared level of understanding on each concept, with the expert members of the TDC. *Actions,* in our study, are the procedures or sub-tasks to be performed by the neophytes. The outcome of the

task is addressed as *uptake* (Slimani, 1987) which demonstrates the product of the acquired knowledge, created as a result of the processes. The process of acquisition consists of various degrees of cognitive involvement, such as hypothesis formulating, hypothesis testing, employing various reasoning strategies, the theoretical background of which will be discussed in Section 3.9 of the present chapter.

As stated above, in the case of determining only the product dimension of acquisition, the framework need not include all the components described above. Only *the input, the purpose* and *the uptake* components would be sufficient to enable us to obtain the product of what the neophytes have acquired. In this case, *the input* would refer to the text the learners are required to read, *the purpose* would correspond to reading the text in order to write down what they have learned, while *the uptake* would correspond to what they produce as a result of their reading the text. Chapter 6 provides a detailed description of the methodological aspects of knowledge acquisition.

Before dealing with the theoretical background concerning observing the processes through the TAPs and determining the product dimension of knowledge acquisition by means of the written recall protocols, it seems crucial to address issues which play an important role in the planning of a teaching programme such as what type of syllabus to adopt and how to organise the course content. In the following section we deal with these subjects.

3.8.1.1 Course Specification and Sequencing

Language teaching, in its broadest sense syllabus specification, involves some kind of choices to be made in terms of what type of syllabus to be adopted. The common syllabus types include the structural syllabus, the notional and functional syllabus, and the situational syllabus. More recently, a major project was achieved in the area of lexical development which involved the assembly on computer of authentic spoken and written English texts. These texts on computer, called corpus, are subsequently analysed in order to determine the frequency of lexical items, which provided the basis for a new view in syllabus design, a "lexical syllabus".

Willis (1990) in explaining the benefits of organising a syllabus around lexis points out that "the word may be a better unit of syllabus design than the structure. This is partly because word is very often prior to structure in that it is word meaning which determines which

structures are grammatical and which are not" (Willis, 1990:27). In support of this statement, Sinclair (1991) claims that "grammar is part of the management of the text rather than the focus of the meaning-creation" (1991:8). To Lewis (1993:33), "more meaning is carried by lexis than grammatical structures. Focus on communication necessarily implies increased emphasis on lexis and decreased emphasis on structure". In relation to scientific lexis, it has been maintained by Huizhong (1986:93) that it is "the scientific or technical terms or the nominals in a science texts that carry most of the subject matter information", since scientific terms are sensitive to subject matter. The relevance of corpus design to our research will be dealt with in the methodology chapter (see Chapter 5).

In addition to the specification of the course content, researchers working in the area of course planning agree that it is desirable to sequence language input in a logical sequence (Dubin & Olshtain, 1986; Richards, 1990; Lewis, 1993). Dubin & Olshtain (1986) compare two main approaches to sequencing course content, which are "linear and cyclical sequencing". In the linear format, the language input to be taught or the areas to be covered are set out in a linear shape, whereas in the cyclical format, the underlying idea is that "a new subject matter should not be introduced once in a syllabus and then dropped, as in the linear format, rather it should be reintroduced in a different manifestation at various times in the course" (Dubin & Olshtain, 1986:55). It is claimed that the cyclical sequencing enable learners to work with the same topic or language input more than once, but each time a particular one reappears it is at a more complex level. Chapter 6 discusses the way in which the concepts are sequenced in the present research and the benefit of recycling in neophytes' acquisition of domain-specific knowledge.

3.8.1.2 Programme Evaluation

It is equally important to address studies on evaluation, which aim to determine the extent of efficiency of a particular programme. Two methods of evaluation, i.e. formative and summative evaluation, are generally recognised (Dubin & Olshtain, 1986; Richards, 1990) in ELT literature. To Dubin & Olshtain (1986) evaluation carried out at the completion of a course in order to measure how effective the course has been in attaining its goals is considered as a *summative evaluation,* whereas evaluation conducted during the implementation of a programme constitutes *formative evaluation.* Kennedy (1985) points out that for students, evaluation provides an opportunity to comment directly on materials and methodology and brings them into the process of design as co-participants. Richards (1990)

considers interviews, questionnaires and diaries as possible methods that can be employed in evaluating a language programme's effectiveness. In the present study, both formative and summative evaluation were carried out. Formative evaluation was obtained by asking neophytes to keep diaries, while the summative evaluation was obtained by means of an evaluation form given at the end of the enculturation studies (see Chapters 6 and 7 for detailed discussion).

The preceding section dealt with the theoretical views concerning the process and the product dimensions to knowledge acquisition and some essential components of a language programme. In the following section, we bring two different approaches which underlie the process and the product dimensions to knowledge acquisition, respectively.

3.8.2 Think Aloud Protocols (TAPs)

Sternberg (1986) states that getting inside a human mind is even more difficult than getting inside a well-protected New York City apartment. This is particularly true in the case of investigating the cognitive processes taking place in the learners' mind. However, there are certain methods which enable a researcher to access an individual's mind. One useful method in the investigation of how acquirers process the incoming data before reaching the product stage is that of the TAPs and verbal reports (Ericcson & Simon, 1980), used in the present study to capture the cognitive processes of neopyhtes during the acquisition of domain-specific knowledge. This method consists of having learners verbalise their thinking, record it, transcribe it and the subsequent analysis. Protocol studies have a long tradition as this method is made use of in the study of some cognitive tasks, such as the solving of mathematical problems or the writing of academic prose (Hayes & Flower, 1980; Cohen & Hosenfeld, 1981), as well as in some translation tasks (Gerloff, 1986; Jääskeläinen, 1984).

TAPs are also utilised in philosophy, linguistics, psychology and education (Cohen & Hosenfeld, 1981; Ericsson & Simon, 1984), in the study of reading processes (Anderson & Urquhart, 1988) and determining the inferencing procedures at the lexical level (Haastrup, 1987). This methodology is made use of in various other domains in order to reveal the processes underlying the learning of new information, in vocabulary tests to measure the ability to acquire meanings of new words from natural contexts (Sternberg, 1986). In the present investigation, TAPs were used for a different purpose from the previous studies, in

tracing the processes involved in the acquisition of domain-specific knowledge, as will be described in Chapter 6.

In Section 3.8 above, a distinction was made between the two dimensions to learning as *process* and *product*, in which the former is dynamic in nature, while the latter refers to the outcome of learning and is static. In the present research although our major concern has been investigating the process dimension to acquisition through the TAPs, the product dimension is also investigated through the written recall protocols, as will be explained in the following section.

3.8.3 Written Recall Protocols (WRPs)

One of the most appropriate methods which would lend itself best to investigating the *product* of what was acquired seems to be WRPs, as it provides a more sensitive measurement research device. It is in the nature of a *retrospective* task in which a retrospective description or the product of learner's acquisition of knowledge is obtained rather than an introspective one, so as not to interfere with the actual ongoing reading process and thus distort the active process of reading since retrospective tasks keep the flow of the reading process intact (Block, 1986). Text recall protocol is not a new method; in the early 1970's, some researchers, for example Kintsch & van Dijk (1978), were interested in asking learners to read a text and write down whatever they recalled, using the amount of recalled information as a basis for deciding the measurement of comprehension. In addition, the cognitive psychology approach has become interested in exploring how readers process texts and how the cognitive structures and processes which the readers bring to the text interact with it to produce comprehension as evidenced by the product of what they produce mainly by analysing readers' recall protocols (Hewitt, 1982; Connor, 1984; Johnston, 1983).

However, one criticism of the method which was raised against it is related to developing an objective analysing system and the time consuming nature of the analysis. Among the approaches found in the literature in terms of scoring the protocols, methods designed to analyse the propositional content of texts have predominated and they have undergone extensive empirical testing. Kintsch (1974), Kintsch & van Dijk (1978) offered a method of analysis which involved carrying out a macro and micro analysis by dividing the recalled text into idea units. Other researchers have utilised and analysed recall protocols using the same method (Carrell, 1984; Swaffer, 1988; Sadoski et al., 1995). In our study, the product of what

was acquired is determined through this method and the analysis is based upon the idea units (See Chapter 6/Section 6.8 for details) .

In addition to the quantitative analysis, certain categories of transformations were identified (Kintsch & van Dijk (1978), among other researchers, in the recall protocols of learners such as "elaboration", "distortion" and "reconstruction". *Elaboration* refers to readers making explicit connections between the text and existing knowledge frames (O'Malley & Chamot, 1990). *Distortion* to Kintsch & van Dijk (1978) results largely from the subject's misinterpretation of textual information. *Reconstruction* deals with the readers' attempts to reconstruct the content using different words but with the same sense (Kintsch & van Dijk, 1978). In the present research these three types of transformations were found to occur in the recall protocols of learners (see Chapter 6/Section 6.9.1 for analysis of the recall protocols).

In the preceding section, task-based reasoning has been described and its relevance to the knowledge acquisition process was illustrated. In addition, some essential components of a language programme such as sequencing the language input and evaluation of the programme have been discussed. These theoretical concepts have particular relevance to the present research in that language input to be offered to learners need to be sequenced and presented in a systematic way to enable the acquisition of knowledge to take place and evaluation of the programme needs to be conducted in order to ensure its efficiency.

During peer interaction, various strategies are made use of to facilitate the acquisition process. It is true to point out that these strategies would also occur when the individuals learn alone. The following section gives a theoretical overview and an outline of the learning strategies.

3.9 Strategies Employed in Knowledge Acquisition

Although the use of strategies is widely recognised as important mechanisms that contribute to the acquisition process particularly in the context of SLA studies, unfortunately this term is far from well defined and no consensus has been reached on its definition.
van Dijk & Kintsch (1983:64) define strategy at a more general level as "a cognitive representation of some macro action to reach a goal". Faerch & Kasper's definition of strategies in the context of learning includes "the devices learners make use of in second and foreign language learning and communication" (Faerch & Kasper, 1985:22). Similarly, Van Lier (1988:23) considers strategies in the context of SLA as "ways of dealing with problems".

Prawat (1989:3) defines strategies in relation to knowledge acquisition as "a broad range of routines that facilitate both knowledge acquisition and utilization". Some classroom research in language learning has focused on what actions learners take to master the target language. O'Malley & Chamot (1990), for example, proposed a distinction between various types of strategies as learning strategies, conversational and other strategies. The following section deals with learning strategies.

3.9.1 Learning Strategies

A useful definition of learning strategy is offered by O'Malley & Chamot (1990:1) as "the special thoughts or behaviors that individuals use to help them comprehend, learn and retain new information". Based on different types of reports, interviews, TAPs, etc. obtained from students learning English as L2, O'Malley & Chamot (ibid.) identified three subdivisions of strategies: cognitive, metacognitive and interactional strategies, which will be elaborated below:

Cognitive strategies: Cognitive strategies provide the mechanisms between new knowledge and previous knowledge. According to O'Malley & Chamot (1990) cognitive strategy is a processing routine that a person can use to facilitate knowledge acquisition and/or retrieval of knowledge already acquired based on a series of mental steps that are performed to achieve a prespecified goal. They further point out that cognitive processes are those general strategies of actions which contribute directly to the acquisition process while the learner is interacting with the data and operate directly on the incoming information in such a way that the use of such strategies enhances learning. The major cognitive processes they identified while learners were acquiring a second language comprise *inference, elaboration and transfer*.

Inference: It involves making guesses as to the meaning of an utterance in the light of all available linguistic cues in combination with the learner's general knowledge of the world, his/her awareness of the situation and relevant linguistic knowledge. Inferencing procedures are particularly useful as they provide information on the learners' hypothesis formulation and hypothesis testing strategies.

Hypothesis formulation and testing: These strategies are considered as the central processes in language learning (Corder, 1967). Learners acquiring a foreign language tend to form a hypothesis on various aspects of the language on the basis of two main knowledge sources; L1 and L2, and the formulated hypothesis is subsequently checked for its validity.

Elaboration: It involves providing additional knowledge by relating new information to other concepts in one's prior knowledge, schema, by making personal associations with the new information. O'Malley et al. (1985:34) identified elaborated knowledge in different categories such as *academic elaboration*, that is, elaborating the given information with domain-specific knowledge, elaboration based on *world knowledge*, that is, using knowledge gained from one's experience in the world, including linguistic knowledge, etc. to relate to the present learning situation. As for the benefit of elaboration, as will be illustrated in Chapters 6 and 7 of the present study, the ability to use elaboration succesfully eventually leads to meaningful learning

Transfer strategy: This strategy involves drawing upon background knowledge, and linking it with the new knowledge structures. Analogical reasoning, as generated by the learners in our study, could be considered as an example of transfer strategy (see Section 3.9.2 of the present chapter).

Metacognitive strategies: Metacognitive strategies involve monitoring one's comprehension and evaluating one's achievement of a given task, paying selective attention to linguistic features, self- monitoring, that is, checking one's comprehension (O'Malley & Chamot, 1990).

Interactional strategies are the third group of strategies that result from the cooperation and interaction with one's peers, particularly during a debate. Collaborative learning entails the use of various interactional strategies which indicate that negotiation of meaning is taking place (Varonis & Gass, 1985:39; Ellis, 1990). In addition to the use of strategies, during collaborative learning, various interactional adjustments are made by learners, that is, attempts are made to understand and be understood by the participants involved. Long (1983), in her study on conversational analysis which was conducted in the context of SLA between native and non-native speakers has identified that "comprehension check", "confirmation check" and "clarification check" (1983:123), were employed by native speakers to adjust their speech in an attempt to facilitate communication in the learning process. Similarly, Flanders (1990), identified such categories as "accepting ideas", "asking questions", "criticising", etc. as teacher talk during an interaction between the teacher and learners. One aim of such an analysis was to identify the contribution of the strategies to the learning process. Overlapping and interruption were also identified as two features in conversation by conversation analysts.

Most learning strategy research in SLA has concentrated on the identification, description and classification of learning strategies used by second language learners. One of the main concerns in such studies was to describe strategies used by more effective language learners so that strategy training could be set up for less effective ones to assist their learning as in the training studies by Hosenfeld (1977), Derry & Murphy (1986), and Block (1986). In addition, Ellis (1994:529) in his study on second language learning investigated the relationship between various learner factors and learning outcomes, and mechanisms that establish these relationships. The result of his study showed that learning strategies have a "mediating role".

However, Langer et al., (1990) raise criticism that these studies were generally training studies of the preselected strategies, those actually made use of by the students have not been examined, yet. They point out that the way in which bilingual students construct meaning during the process of acquisition and the spontaneous reasoning strategies they use while acquiring knowledge of a specific discipline and the way in which these interact with knowledge construction processes have been left unexplored research areas. The present research is therefore expected to provide insights into strategies spontaneously made use of by adult learners during the process of acquisition of domain-specific knowledge through L2. It is important to offer our own definition of strategy as applied to knowledge acquisition. The cognitive psychologists Tweeney (1991) and Nersessian (1992) have described strategies as cognitive processes and heuristic devices humans use, based on analysing strategies made use of by scientists in their discovery of scientific laws. We consider their definition particularly relevant for our research.

The preceding section has explored all-purpose learning strategies, whereas the following section deals with one important reasoning strategy, analogical reasoning and metaphorical reasoning, through which acquisition of knowledge is brought about.

3.9.2 Analogical Reasoning in Knowledge Acquisition

> How do we ever understand anything? I think, by using one or another kind of analogy - that is, representing each new thing as though it resembles something we already know.
> (Minsky, 1985).

The history of studies on analogy dates from the beginning of the present century along with the creativity in the literature and art. Koestler (1964) in his work on The Act of Creation examined accounts of creativity in different domains including literature, the arts and science

and proposed that creativity often results from "juxtaposition of two sets of very different ideas" (Koestler, 1964:12). To Kneller (1965) however, creativity is not limited to the arts only; the scientist becomes as creative as the writer, and he argued that:

Invention, scientific thinking, and aesthetic creation do have in common a facility for the rearranging of previously experienced elements into new configurations. Just as a painter shows the four sides of a barn at once, and a writer speaks of something as being as relentless as a taximeter and Newton sees the analogy between apples and planets, there is manifest an activity of the mind that seems to be of the same weave despite the differences of coloration. (Kneller, 1965:12).

In fact, as the writer transforms his/her experience of the human scene into a novel, a poem or a play, similarly the scientist tests and probes the data s/he has acquired in order to produce a new theory. Both are said to achieve this by rearranging existing knowledge and experience into a new form or pattern.

Bronowski, comparing the works of science and arts stated that:

The discoveries of science, the works of art are explorations - more, are explosions, of a hidden likeness. The discoverer or artist presents in them two aspects of nature and fuses them into one. This is the act of creation, in which an original thought is born, and it is the same act in original science and original art. (Bronowski, 1956:30-31).

Modern views of analogy can be traced to the pioneering influences of the philosopher Mary Hesse who put forward that analogies in science are powerful sources in discovery and conceptual change and admitted that "if a scientific theory is to give an "explanation" of experimental data, it is necessary for the theory to be understood in terms of some model or some analogy with events or objects already familiar" (Hesse, 1966:1). Hesse reported the views of two scientists in her work *Models and Analogies in Science*. One of the scientists was the French physicist and philosopher Pierre Duhem, who recognised the value of using mechanical models in formulating a theory in physics. He admitted that models drawn from familiar mechanical objects and processes may be useful "psychological aids". However, Campbell, an English physicist who had a stronger position in support of analogies, argued that

...analogies are not "aids" to the establishment of theories; they are an utterly essential part of theories, without which theories would be completely valueless and unworthy of the name. It is often suggested that the analogy leads to the formulation of the theory, but once the theory is formulated the analogy has served its purpose and may be removed or forgotten. Such a suggestion is absolutely false and perniciously misleading. (in Hesse 1966: pp:4-5).

Even at an earlier date, Robert Oppenheimer, made the following comments about the role of analogy in scientific understanding, in an address to the American Psychological Association in 1956.

> Analogy is indeed an indispensable and inevitable tool for scientific progress.... Whether or not we talk of discovery or of invention, analogy is inevitable in human thought, because we come to new things in science with what equipment we have, which is how we have learned to think, and about the relatedness of things. We cannot, coming into something new, deal with it except on the basis of the familiar and the old-fashioned.
>
> (Oppenheimer, 1956:129-130).

The formal reflections of creative scientists through informal documents, laboratory notebooks and journals, provided one major source of evidence concerning the processes of analogical reasoning. When these records were later studied by linguists employing what they called "cognitive-historical" analysis (a method which aims to reconstruct scientific thinking by means of cognitive theories, Nersessian, 1992), it was understood that physical analogies are utilised as devices to communicate new conceptualisations to the scientific community and that the deep analogies formed the basis of solutions to unfamiliar problems as well as to the development of a new theory. The important role analogy plays in scientific discovery as well as creativity has been highlighted by many researchers (Vosniadou, 1989; Vosniadou & Ortony, 1989; Nersessian, 1986, 1992).

Anecdotal reports of creative scientists and mathematicians suggest that the development of a new theory frequently depends on noticing and applying an analogy drawn from a different domain of knowledge (Hadamard, 1945; Nersessian, 1992). In the diaries and notebooks left by Maxwell, Faraday, Einstein, Darwin and many others, analogical mapping shows the heuristic processes being utilised in the context of a self reflective construction of mappings across domains. These pre-eminent thinkers are said to have relied heavily on analogy and constructed their analogy to explain the physical world from their observations of the social world and have shown that analogy has played a central role in the construction of a new scientific concept.

Faraday, for example, has left us about 30.000 experiments as well as a large number of speculative idea books, etc. Faraday's daily laboratory notebooks and diaries are held in the Archives of the Royal Institution of Great Britain constitute "a rich source for the linguists' analyses" (Tweney, 1991:301). These records reveal a good deal of systematic invention and

exploration of recording techniques by Faraday as well as much about his thinking about science. From the outset of his career as a psychologist, William James argued for the critical role of analogical thinking in the development of human knowledge, scientific or otherwise (quoted in Leary, 1990:45). Many scholars, including Einstein, have recognised analogical quality inherent in even as sacred a discipline as mathematics, understanding that numbers to a problem, whether in pure or applied research, is a theoretical tactic intended to persuade rather than to present a completely definite account of reality (Leary, 1990:10-11).

3.9.2.1 Some Analogies Generated by Scientists

Among hundreds of analogies that have been used by scientists, the analogies that qualify as most important have been identified according to two criteria by Thagard (1993), Gentner & Holyoak (1997). First, in relation to a clear contribution to some vital stage of a scientist's thinking, whether it was the discovery or the development of an idea. Second, the contribution made by an analogy to a major theoretical advance. Historians, philosophers and psychologists of science have documented many instances of analogical thinking. This section first presents a collection of some of the most important analogies that scientists have used, then it provides an account of the main mechanisms required for analogical thinking in science and finally it investigates analogical reasoning paying particular attention to the role it plays in knowledge acquisition.

Newton and universal gravitation: Newton's concept of universal gravitation was conceptualised as the movement of masses of matter toward each other "as analogous to the attraction of a human person toward another". (Leary, 1990:10).

Darwin and natural selection to artificial selection analogy: Darwin compared between animal breeding controlled by humans and the natural selection. The analogy that played an important role in the development of Darwin's theory of evolution is the natural selection. Darwin is reported to have compared the natural selection of variants carried out by nature to the artificial selection performed by breeders.

Rutherford and solar energy: Rutherford is reputed to have used the solar system analogy viewing the electrons as revolving around the nucleus in the same way that planets revolve around the sun in arriving at a conception of the atom. (Dreistadt, 1968; Gentner, 1983).

Einstein and gravitation: Einstein performed many thought experiments based on analogies, one of which is about riding on a light beam and travelling in elevators (Holyoak, 1985). He imagined a high building and inside it an elevator that was falling freely. Inside the elevator physicists, not aware that their ride might end in disaster, were performing experiments. Einstein is said to have derived his *Principle of Equivalence of Gravitation and Inertia* based on his analogy of his experience while riding in an elevator (Thagard, 1993).

Kekule's snake and benzene: A somewhat different example of the use of analogy in chemistry comes from Kekule who discovered the "benzene ring", the molecular structure of benzene, usually represented as a hexagon, from which he developed his "ring" theory which showed the importance of molecular structure in organic chemistry, in 1865. In fact, Kekule had been struggling with the question of the discovery of the structure of benzene for some time, without success. Then one night he had a dream in which he imagined a snake curling back on itself and biting its tail (Dreistadt, 1968). When Kekule arose, he realised that the image of the curled snake formed a visual analogy for the structure of the benzene ring, which enabled him to see the relation between two very disparate elements - the image of the snake and the structure of benzene. He was then led to the hypothesis that the carbon atoms in benzene are arranged in a ring similar to a snake biting its own tail (Sternberg, 1986; Boden, 1990; Thagard, 1993).

Maxwell and electro magnetism: A further example is provided by Nersessian (1992) who examined Maxwell's use of physical analogies, which is used by Maxwell himself in explaining his method. A physical analogy, to Nersessian (ibid.) "exploits a set of mathematical relationships as they are embedded in a source domain so as to analyse a target domain about which there is only a partial knowledge". In Maxwell's case, the source domain was fluid mechanics and the target domain was electro magnetism. By constructing an analogy between these two areas of physics, Maxwell was ultimately able to construct an effective mathematical theory of electromagnetism.

These and several other examples of analogical thinking reflect the underlying thinking mechanisms in developing knowledge "in domains for which no *ad hoc* innately specified competence exists" (Atran, 1990:11), and has been characterised as being the result of processes that map the conceptual structure of one set of ideas, variously called a base domain, better grounded domain or core domain since it is the familiar domain that serves as

a source of knowledge, into another set of ideas, called a target domain since it is the domain being explored, and technically the whole process is called "an analogical mapping" (Boden, 1977; Holyoak 1985; Keane, 1985).

3.9.2.2 Principles of Analogical Reasoning

The studies of many cognitive scientists have contributed to a consensus on many issues concerning analogy (Gick & Holyoak 1980; Gentner, 1982; Keane, 1985). Yet, conscious scrutiny of an explanation is considered an important aspect of analogy, as noted by Heidbreder (1945:5) "analogies are too tricky to be given free reign" and he further stated that "analogies commonly begin as imprecise feelings of likeness and are made precise only through careful, often sustained analysis". The process of constructing mappings is not easy; each mapping needs to be explored and tested in depth to determine its relevance, aptness and usefulness (Polya, 1973; Gentner, 1982). Analogy, to Holyoak & Thagard (1995:7), requires "taking a kind of mental leap". Like a spark that jumps across a gap, an idea from the source analogue is carried over to the target. As stated by Holyoak & Thagard (1995:7-8) "the two analogues may initially seem unrelated, but the act of making an analogy creates new connections between them".

Although making an analogy requires *a mental leap*, that leap is not a random and an arbitrary process. Thus, analogical thinking is based upon certain principles and is characterised in terms of the following major components or processes as commonly agreed by several researchers (Gick & Holyoak, 1980; Gentner, 1980, 1982, 1983; Holyoak, 1985; Keane, 1985; Holyoak & Thagard, 1989) to show whether it is a useful piece of explanation or not. (Each step will be illustrated in relation to Rutherford's conceptualisation of the structure of the atom).

1. Accessing the relevant analogues from the source domain: The first principle is related to accessing or generating relevant analogues from one's memory that would correspond between domains. Therefore, this initial step constitutes *the retrieval step* in analogy (Holyoak & Thagard, 1995). In general, similarity has been considered as one of the basic constraints that guides the creation of an analogical thinking between a familiar, source domain and an unfamiliar, target domain and that similar concepts are said to contribute to analogical thinking, particularly in the initial access step (Gentner & Landers, 1985; Vosniadou, 1987; Vosniadou & Ortony, 1989; Holyoak & Thagard, 1995). As suggested by

Vosniadou & Ortony (1989) a successful, useful analogy depends upon there being some sort of similarity between the source and the target domain and that the perception of similarity is likely to play a major role in some of the key processes associated with analogical reasoning or similarity can be constructed in a reasoning process.

In the case of Rutherford's early conceptualisation of the structure of the atom, *the solar system* is used as a common theme in the analogy. Rutherford noticed that there are objects in the solar system that attract each other and similarly objects in an atom attract each other. That the objects in the solar system attract each other served as the *base* or *the source domain* and are analogued to objects in the atom that attract each other, in which the atom served the *target domain*. In fact, as suggested by Hanson (1961:129), Rutherford conceived of the atom "as a miniature solar system - electrons circling the nucleus as planets circle the sun".

2. Mapping or transferring certain aspects of the source into the target domain: This second step constitutes *the mapping step* in analogy (Holyoak & Thagard, 1995). Analogy entails a mapping process, finding a structural alignment and "finding correspondences between the elements of source and target domain" (Holyoak & Thagard, 1989:304) and mapping some part of the information associated with that analogue onto the target domain (Vosniadou & Ortony, 1989). A familiar analogue needs to be mapped onto the target concept to identify systematic correspondences between the two, thereby aligning the corresponding parts of each analogue. Collins & Burstein (1989) identified three fundamentally different kinds of entities that are compared and mapped: *systems* (as in the case of Rutherford), *concepts* (i.e. which components of the concepts in the source domain correspond to which components in the target domain), and *properties*, (i.e. which properties of each component including relations between components in the source domain correspond to which components in the target domain).

The structure mapping theory: The mapping process has been described in the "Structure Mapping Theory" set forth by Gentner (1983) and developed later by Gentner (1989) describes the implicit interpretation of rules of the analogy. The process of mapping is based on the principles of *consistency* and *systematicity*. According to the consistency principle of the theory, analogy entails finding a structural alignment, or correspondences between the elements (propositions, predicates and objects) of two domains (Gick & Holyoak, 1983; Thagard, 1988; Holyoak & Thagard, 1989). The formal definition of structural consistency

has been developed in terms of establishing an *isomorphism* - a set of consistent, one-to-one correspondences - between the elements of the source domain and the target domain. The concepts and relations in the source domain (familiar analogue), need to be mapped to the corresponding items in the target domain (the target analogue) to identify systematic correspondences between the two, thereby aligning the corresponding parts of each analogue (Gentner, 1983; Gentner & Markman, 1997), thus generating inferences. As confirmed by Holyoak & Thagard (1989:295), "at the core of analogical thinking lies the process of mapping: the construction of orderly correspondences or structural parallelism between the elements of a source domain analogue and those of a target" to construct inferences about the target by essentially carrying over propositions from the source after substituting the appropriate corresponding elements in the target domain. Gentner (1983) and many other theorists (Gick & Holyoak, 1980; Winston, 1980) stressed the importance of consistency in mapping. In the case of Rutherford's solar system analogy, the assumption that the electrons revolve around the nucleus just as planets revolve around the sun is done by a transfer of the analogical inference process.

Spiro et al. (1989) distinguish between "single" and "multiple analogies". During the mapping process only one analogy may be drawn which is called *single analogy* where the use of a single mapping occurs between a source analogue and a target concept. Alternatively, more than one analogy may be drawn from the source domain that corresponds to the same concept in the target domain leading to *multiple analogies.* Mapping thus operates either in a *one-to-one* or *many-to-one mapping,* that is, *multiple mappings* (see the data analysis for examples of single and multiple analogies in Chapter 6).

The second principle of the process of mapping is based on *systematicity.* In analogical reasoning, what is important is the mapping of a common system of relations that can apply in both the source and the target domains. Analogy conveys a system of connected knowledge, not a mere assortment of independent facts, laid down in the principle of *systematicity.* Gentner states that (1983) analogy is a device for conveying that two situations or domains share a relational structure despite arbitrary degrees of differences in the objects that make up the domains. "In analogy, it is the common relations that are essential, not the common objects" (Gentner & Markman, 1997:46). Thus, an analogy is said to be a way of noticing and mapping relational commonalities independently of the attributes of objects in which those relations are embedded (Gentner, 1983). Therefore, the structure mapping theory

asserts that identical relationships hold among the non-identical objects (Gentner & Markman, 1977) and as pointed out by Gentner (1983, 1989) the particular relations mapped need to be those that are governed by higher-order relations that link lower-order relations, rather than isolated predicates. In the case of Rutherford, the relations about planets revolving around the sun are transferred into the atom domain to create a new conceptual structure that electrons revolve around the nucleus. The analogy made was that the sun is larger than the planets and similarly the nucleus is larger than the electrons.

Another point to emphasise is related to whether the immediate predictions deriving from these correspondences are plausible, whether consequences are interesting or powerful. It is stated by Gentner & Grudin (1985) that the structure conveyed by analogy depends not only on the degree of systematicity in the analogical domain but also on the *precision* and *aptness* of the particular correspondences set up, judging the soundness of the match. In other words, the analogy generated needs to be relevant in a particular context.

In addition to the principles listed above, there is also the principle of "relevance" proposed by Sperber & Wilson (1996:122) which concerns that "an assumption is relevant in a context if and only if it has some contextual effects in that context". This would have important implications for acquiring domain-specific knowledge. The assumptions made by the neophytes through analogical reasoning need to be assessed in relation to their relevance to a particular domain of discourse in which it is uttered, as in the domain of economics and business studies. (See the relevance strategy employed by the neophytes in the data analysis chapter of the thesis, Chapter 6/Section 6.2.2).

3. Forming coherent integration of knowledge: The third component of analogical mapping involves whether predictions derivable from the analogy form a coherent and interrelated assertion. In analogical mapping, the object correspondences or entities from the source domain are used to generate sets of inferences in the target domain. Hence, this stage involves *evaluating* and adapting those *inferences* to take account of unique aspects of the target domain (Holland et al., 1986). The resulting mapping allows analogical inferences to be made about the target concept, thus creating new knowledge to fill gaps in the conceptual structure and in understanding. This constitutes *the inference step* in analogy (Holyoak & Thagard, 1995).

Carey & Spelke (1994) highlight that "imaginistic representations" play an important part in constructing mappings between domains to express relationships in a comprehensive way and they serve as a good bridge between domains. Gentner's (1983) "systematicity principle" posited that "when knowledge is transferred from one domain into another, there must be a coherent, integrated piece of knowledge rather than fragmentary pieces to be transferred" (Gentner, 1983:33). With reference to Rutherford's case, the integrated knowledge that attraction and weight difference cause the planets to revolve around the sun is transferred before unintegrated information about the earth having life on it.

As stated above, in making the analogy between the solar system and the atom, the only relational similarities shared by the source and the target are maximised by mapping of the higher-order relations, such as *cause*, instead of lower-order relations such as *bigger than* or isolated predicates such as *hot* in a goal oriented processing system (Gick & Holyoak 1980, 1983; Holyoak 1985, 1989). Gentner (1983) illustrates the systematicity theory by considering the analogy between the solar system and Rutherford's model of the atom. The sun maps onto the nucleus, and the planets map onto the electrons. The properties of the sun, such as its yellowness, are dropped, but the higher-order relations are carried over. For example, *the sun's attraction of the planets causes them to revolve around it* yields the inference, *the nucleus's attraction of the electrons causes them to revolve around it*. Objects of the source domain (sun and planets) are mapped onto objects of the target domain (the nucleus and electrons of atom).

Given this correspondence of objects, analogy conveys that the relationship holding between objects in the solar system also holds between that of the atom. For example, there is a force attracting peripheral objects to the central object, those peripheral objects revolve around central objects; that central object is more massive than peripheral objects, etc. In the source domain, objects are mapped onto quite dissimilar target objects (the sun onto the nucleus). It is the relations in the source domain that are preserved, that is, the *attract* relation and the *revolve* relation between planets and the sun are carried across to apply between electron and the nucleus, while separable attributes of the source objects, colour or temperature of the sun are left behind.

4. Changes in the conceptual structure: Finally, as pointed out by Carey & Spelke (1994), mapping thus created can produce changes in the conceptual structure in both domains leading to subsequent learning. According to Susan & Spelke (1994:179), "conceptual change involves overriding core principles, creating new principles and new ontological types. It brings the emergence of new principles, incommensurable with the old, which carve the world at different points". In the aftermath of analogical reasoning, learning can result in the generation of new schemata, the accretion of new knowledge to one's schema, and new understandings of old instances and schemas leading to useful generalisations of a new principle (Gentner & Holyoak, 1997; Collins & Burstein, 1989). This final stage is *the learning step* in analogy (Holyoak & Thagard, 1995). (Each of the stages above will be illustrated against our own data obtained in knowledge acquisition. See Chapter 6 for the analysis).

As a result of analogy Vosniadou states that (1989:434):

what develops is not, it would seem, the ability to engage in analogical reasoning *per se* but the content and organisation of the knowledge base on which analogical reasoning is applied.

In illustrating the reflections of scientists in connection with mechanisms of conceptual change, the science philosopher Duhem (1949), who himself is said to have used analogy, suggested that scientific physics is not built directly upon common-sense understanding of physical phenomena but depends instead on translations between the language of ordinary experience and the language of ordinary mathematics. According to Duhem, the objects of science do not consist of concrete material bodies but numbers. To provide explanations for physical phenomena, physicists are first said to translate from a physical to a mathematical

description of the world using their knowledge of numbers, and then they look for generalisations and regularities in the mathematical description measurements to create *mappings* between objects in the source domain, that is, the numbers and those in the target system, that is, the physical bodies. These generalisations, when translated back into the language of everyday objects, constitute the physicist's law.

3.9.2.3 Types of Analogies

Some of the mental leaps accomplished by scientists by means of analogy have ended in creative triumphs; others in failures. An analogy can thus be in the nature of a "positive analogy" and "negative analogy" (Holyoak & Thagard, 1995). Positive analogy, as illustrated in Section 3.3.2, consists of those underlying relational features that "the entities in both the source and target domains share and that provide the basis for the analogy" (Hesse, 1966:8). Holyoak & Thagard (1989) argue that in the absence of clear similarities, useful analogies are often missed and that if misleading surface similarities are present, false analogies may be accessed leading to a "negative transfer" (Novick, 1988). Negative analogy results from a situation when the source analogy accessed in the source domain does not share any underlying features with the target domain. (See Chapter 6/Section 6.3 for examples of negative analogies generated by neophytes). An analogy exists between two objects in virtue of their common properties, for example the earth and the moon. Both are large, solid, opaque, spherical bodies, receiving heat and light from the sun, revolving on their axis, and gravitating toward other bodies. These properties constitute their positive analogy (Novick, ibid.). On the other hand, false analogies may be accessed leading to a negative transfer, such as the moon is smaller than the earth, more volcanic, and has no atmosphere and water. In these respects, there is a negative analogy between them (Hesse, 1963).

Between-domain and within-domain analogies: Vosniadou (1989) distinguishes between two kinds of analogies; *between-domain* analogies, those in which the analogically related items are drawn from conceptually different or remote domains, and *within-domain analogies*, those in which the items are drawn from the same domain, or conceptually very close domains. In the case of between-domain analogies, an analogy exists between two systems (concepts, theories, etc.) which belong to fundamentally different conceptual domains but which share similar explanatory structures. It has been maintained that most scientific discoveries mostly exploited between-domain analogies (Thagard, 1992), the

analogies illustrated in Section 3.9.2.1 above constitute examples to this type. (Chapter 6/Section 6.2.2 of the thesis illustrates between-domain analogy, as identified in our study).

To illustrate within-domain analogy, Vosniadou (1989) gives the example of a Styrofoam cup from which to reason analogically about a ceramic mug. To account for the analogical relationship between these two items, she states that an analogy exists between a ceramic mug and a Styrofoam cup to the extent that the example of a ceramic mug can be used as a source from which to determine whether the target satisfies a given goal, which is that of drinking hot liquids. Between-domain analogies do not share similarity in non-analogy related surface properties, such as colour, shape, names, place, they can be accessed only by noticing the similarity in their underlying structural relationships. It could be pointed out that different psychological processes operate in accessing a between-domain analogue compared to accessing a within-domain analogy (see Section 6.2.2 of the thesis illustrating a within-domain analogy on the concept *retailer*).

The question one would raise at this point is: "Are heuristic processes of the kind described above and the analogical mapping that results from them unique to scientists or do they also operate outside the circle of developed science?" In other words, do they bring conceptual change to adult learners and differences in the base knowledge? It is the subject of the following section to illustrate this issue.

3.9.2.4 Analogies Outside the Circle of Scientific Theories

Besides the role of analogy in scientific concept formation, in 1980s various studies were carried out concerning analogies in various domains. Studies of conceptual changes in childhood suggested that within-domain transfers in early childhood have already been observed (Vosniadou & Brewer, 1987; Brown, 1989, 1990) and it has been stated that young children can reason by analogy between objects. In other words, when children have knowledge to map, they can produce transfer on the basis of deep structural principles rather than of perceptual characteristics. From the production point of view, analogical reasoning has been found as a common mechanism used by novices and children in solving problems and answering questions (Vosniadou & Ortony, 1989). Expert subjects have been observed to generate and use analogies during problem solving (Clement 1981, 1986).

Gick & Holyoak (1980) have studied analogical mapping in problem solving situations by giving subjects analogous stories to a "radiation problem" with and without an analogue. Those who were given an analogue produced a higher solution than those who were not given an analogue. This was the evidence that people could use an analogous story to solve the problem with either a semantically close story analogue (about a surgeon using rays on a cancer) or a semantically remote analogue (a general story). Holyoak (1985), Gick & Holyoak (1983), in other studies, became convinced that the analogy offered a richer approach to problem solving than other methods that were available.

In addition, analogies have been deliberately used in learning situations (Gentner, 1982, 1983, 1987; Gentner & Gentner, 1983). Teachers frequently used analogies to render unfamiliar subjects comprehensible to their students by introducing a source analogy to help with a target problem (Mayer, 1985; Thagard, 1992; Mason, 1994). Analogy, already recognised as a powerful tool in scientific discovery and learning, has been found to be a productive way in constructing explanations and building arguments as well as in triggering a process of knowledge restructuring while learning a new topic, particularly in science, as in the study by Mason & Sorzio (1996) which investigated analogical reasoning in knowledge acquisition in a school setting. Given the importance of analogical reasoning to scientific understanding, it is not surprising that analogies are used often by authors of science textbooks to explain concepts to students.

The role of analogy was demonstrated in some other domains, for example, in solving electric circuit problems (Gentner & Gentner, 1983). However, given the extent of the empirical research mentioned so far, it has been claimed that much more detailed tests on analogical processes need to be carried out (Eysenck & Keane, 1990). Despite such diverse research findings, it has been pointed out that there are still gaps in how learners acquire knowledge of a specific domain. Susan & Spelke (1994), maintain that whether adults spontaneously construct mappings across domains in the process of constructing knowledge has not yet been documented. Vosniadou (1989:125) argues that "we still do not know how knowledge restructuring occurs and the role that analogical reasoning plays in it" and points out that "this is an interesting area for research".

As will be described in Chapter 6 in relation to analysing TAPs, analogical reasoning has been extensively generated by neophytes during acquisition of domain-specific knowledge, among other strategies and processes. Thus, the present research contributes some insights

into this phenomenon in relation to the way adults spontaneously construct analogies while acquiring knowledge of a particular discipline, i.e. economics and business studies, and the contribution which the generated analogies make to the process of knowledge acquisition and concept formation via L2.

In addition to analogical reasoning, metaphorical reasoning has also played a significant role in scientific discovery and in the knowledge acquisition processes of neophytes. The section below deals with metaphor, a related concept to analogy.

3.9.2.5 Metaphorical and Analogical Reasoning

It has frequently been pointed out by psychologists and cognitive linguists who have studied creativity that analogies and metaphors are often used by scientists in making their discoveries (Leary, 1990; McReynolds, 1990; Nersessian, 1986, 1992). Dreistadt's (1968) analyses of scientists' thinking based on representative examples from major sciences ranging from astronomy, physics, chemistry, biology to mathematics and computer engineering show that scientists often used mental images - elevators, pumps, apples, maps, snakes and puzzles - in their reasoning process.

Hoffman (1980) supports the above view stating that metaphor is an analogy that is "fancied-up" by inference making and resemblance-finding and that metaphor is inevitable and necessary to science, and cognitively prior to scientific description because of psychological factors in learning, inference making, symbol formation, and explanation. Crookes (1992) stated that metaphors, like analogies, are commonly considered related processes and that he recognised the central role that metaphor and analogies play in theory building, particularly in the context of SLA. He illustrated this by stating that theories are cognitive objects arising in the scientist's mind prior to their linguistic or logical formulations in the form of analogies and metaphors. Schumann (1983:54) confirming this view, points out that "what I'd like to suggest is that, for a moment, we should look at the acquisition/learning distinction and controlled versus automatic processing as literary metaphors rather than scientific constructs".

Gregg (1993:289), illustrating the use of metaphor notes that "I imagine further that most of the 40 or 60 SLA theories are not in fact really theories, but rather either descriptive, non-explanatory frameworks for L2 researchers on the one hand, or else metaphors for organising one's thoughts on the other". Lantolf (1996) agrees that both Gregg and Schumann are

correct in implicitly, at least, relating scientific theories, SLA or otherwise, to metaphors and admits that SLA theory building, like all scientific theory building, is about incorporating metaphors into scientific practice through repetition and subsequently mythologising them into literal language. Gerger (1990:267) puts it as "indeed without metaphor, scientific thinking as a whole would remain paralyzed".

It is clear from the preceding discussion that in every metaphorical statement some aspect of analogy is presented and thus metaphors in some cases create analogies upon which they depend. However, it would be worth explaining similar and different points between these two concepts. To Dreistadt (1968), a metaphor is an analogy expressed in verbal form. Metaphor, as in analogy, is defined as a cognitive mechanism through which knowledge is transferred from one domain to another (Lakoff & Johnson, 1980; Lakoff, 1990, 1993) and metaphorical reasoning brings into correspondence two domains of knowledge; one is a familiar physical domain which is the source domain and the other is a less familiar abstract domain, the target domain. Similarly, as stated by Hanson (1970), if a metaphor explains something unfamiliar in terms of the familiar, then it can do so for the theorists as well as the student. Metaphorical reasoning, as in the case of analogy, might require "taking a kind of mental leap" (Holyoak & Thagard, 1995:7), like a spark that jumps across a gap, an idea from the source domain is carried over to the target. The metaphors that really led to scientific advancement were those that evoked a deep sense of insight in scientists. Some examples given to illustrate the metaphorical reasoning process of scientists are provided below, by Leary (1990:37).

One of the most famous metaphors was Locke's comparison of the human mind to a *tabula rasa*. In his psychological writings, James analogued thought and consciousness to a stream. Freud, in his perception and thought processes transferred various metaphors from such domains as physical dynamics, hydraulics, physiology, mythology, ancient history and technology and used analogies like energy and force, flow and resistance, repression and conversion, defence and aggression.

Many researchers have been concerned with the question of whether scientific analogy and metaphors are alike. Gentner (1982) and Holyoak & Thagard (1995) in describing the characterisation of analogy and metaphor claim that they are more alike than different in that both share many of the same structure-mapping processes. A metaphor always connects two domains in a way that goes beyond our ordinary category structure, as described above, and

metaphor underlies many of the mental processes as analogical thinking. Many metaphors are based on deeper relational system mappings.

Mapping, as in analogical reasoning, is not an arbitrary process. In metaphor two kinds of mappings are introduced as "ontological" and "epistemic" (Lakoff 1993; Kövecses, 1986; Lakoff & Kövecses, 1987), the former of which seems to correspond with isomorphic relations in analogy, while the latter corresponds to the consistency principle, as described in Section 3.9.2.5. Ontological mappings are correspondences between basic structural entities and events in the source domain and entities and events in the target domain (see Chapter 6/Section 6.2.2 on the data analysis for a detailed description of both types of mappings).

Although it is possible for a metaphor to be intended as purely illustrative, it does serve as a bridge, mental leap or a transformation between a familiar domain and an abstract one, as in the case of analogy. The main similarities between these two concepts can be related to the fact that metaphors and analogies operate on the same principles in relation to mapping. As in the case of analogy, metaphor brings into correspondence two domains of knowledge allowing people to express thoughts indirectly (Holyoak & Thagard, 1995). The prominent scholars of mapping include Lakoff & Johnson (1980) and Lakoff & Turner (1989) whose work is based on the idea that metaphor is a mapping between domains.

Lakoff & Johnson (1980) put forward some conceptual metaphors which are deeply entrenched in everyday human thought and are used to understand some very basic domains of knowledge and everyday thought such as fire, journey, people, plants, buildings and containers in understanding more abstract domains of experience metaphorically. They argue that we create the target domain by mapping the elements of the source. Lakoff (1993), for instance, has analysed metaphors in terms of mappings between analogous domains built on the fundamental conceptions of "life as a journey" which permeates everyday thinking.

Metaphors provide the necessary schemata for producing new thoughts about complex and abstract domains of knowledge. Lakoff (1990:54) proposed the *Invariance Hypothesis* which govern metaphorical mapping. This hypothesis claims that many abstract concepts arise from metaphorical mappings and that abstract reasoning arises via metaphorical mappings of spatial concepts. According to this principle, the experiential "logic" of the source domain, or the image-schema structure, with its inference patterns and associated value judgements is generally preserved in the metaphorical mapping. When cognitive aspects of image-schemas

are preserved by the mapping, they in turn preserve the inferential structure of those spatial concepts.

Through metaphors, image schemas are often used to structure abstract experience. Some conceptual metaphors map image schemas onto abstract domains which organise our experience of physical space. There seem to be two major types of image schemata in Lakoff & Johnson (1980), PATH and CONTAINER. Additionally, there is also a culturally related image schema like *war* as in the metaphor "argument is war", etc. The first two image schemas, PATH and CONTAINER, have particular relevance for the present research, since some metaphors employed by neophytes during the process of acquiring some abstract concepts in the target domain are built on image schemas. The PATH schema, as an image schema, emerges from physical experiences involving motion or structural elements from one location (source) to another (goal or destination) through a path. According to the "experiential goal" of the PATH schema, paths are typically goal-oriented. The PATH metaphor with its inferences yields additional metaphors with their own associated value judgements. It presupposes that reaching a destination involves passing through certain stages. A specific kind of path is the 'journey' which has a goal-oriented phenomenon. Various concepts in the domain of economics are conceived by neophytes in terms of a path towards a goal. Section 6.4 of the thesis discusses neophytes' reasoning based on this particular metaphor in conceptualising the development of Turkey.

The next image schema which is used to conceive abstract experience is the CONTAINER schema. The "experiential logic" of the container schema is that the container corresponds to the concept of a building such as rooms and houses which have a bounding surface with an inside and outside as well as in and out orientation. In addition to the above image metaphors, other conceptual metaphors most widely used by neophytes in acquiring economics concepts include orientational metaphors proposed by Lakoff & Johnson (1980). Orientational metaphor involves understanding certain phenomena as having certain orientations relative to the environment, such as up-down, in-out as in the case of "good is up and bad is down". (See neophytes' acquisition of *inferior goods* in terms of up-down image schemas in Chapter 6).

The preceding discussion has outlined similar points between analogy and metaphor. As for the differences between these two concepts, McReynolds (1990) differentiates metaphors and analogies stating that differences between them are not always clear-cut and he points out that

there is a growing tendency to employ the word metaphor as a generic term. Gentner (1983) points out that a number of different kinds of comparisons go under the term metaphor, many (perhaps most) metaphors are predominantly relational comparisons, and are thus essentially analogies. Thus, it is the underlying relational mapping that is common to analogies and metaphors. It is often noted that a metaphor says one thing to mean another which is close to what analogy accomplishes and involves understanding the target in terms of the source (Thagards & Holyoak, 1985).

For the purpose of our data analysis it is not necessary to make any sharp distinction between analogical and metaphorical reasoning, as we shall be focusing on what they have in common, namely, structural isomorphism between the source and the target domains. Our own conclusion in relation to these concepts is that analogy is more explicit while metaphor seems to be more implicit. We fully agree with Thagard (1988) who points out that since analogy is primarily a matter of underlying structural isomorphism, then metaphor can be seen in similar terms as a type of analogical process, since they share similar points as far as the mapping is concerned. While the terms analogy and metaphor are frequently substituted for one another in the way they are used by researchers, such as Leary (1990), as pointed out by Glynn (1991) analogy tends to be used more often in scientific and technical contexts, whereas metaphor is used more often in literary contexts. Some researchers such as Sternberg (1966) and Dreistadt (1968), seem to favour the use of "metaphor" in their descriptions, others Thagard (1993), Gentner & Grudin (1985) refer to "analogy" in connection with the use of these concepts in learning and scientific discovery. Since the examples presented in our research are from the science domain, the concept of analogy will mainly be used, but, the principles of metaphor will be referred to where appropriate in the analyses of neophytes' reasoning processes in knowledge acquisition.

3.10 Summary

This chapter was devoted to establishing the first theoretical framework of our study. First, the mental representation of knowledge from schema, frame and script theories has been investigated. The chapter then proceeded with the discussion on learning and acquisition, and it has been pointed out that the distinction between the two concepts remains unresolved. The next issue dealt with was the theoretical distinction between meaningful and rote learning; the implications of meaningful learning to knowledge acquisition were highlighted. After a review of learning theories it was suggested that the constructivist theory would be more

conducive to the acquisition of domain-specific knowledge. A hypothetical model for the acquisition of domain-specific knowledge based on the social knowledge acquisition model of Carley was introduced and the crucial role of collaboration in the knowledge acquisition process was highlighted. Various views towards accessing written knowledge were explored and the relevance of WER for the present study was emphasised. Then, three processes - accretion, tuning and restructuring - involved in converting input into knowledge structures leading to knowledge acquisition were examined. The appropriacy of TAPs as a method for analysing the cognitive processes involved in knowledge acquisition, while WRPs as a method for determining the product of what was acquired were suggested. Finally, analogical reasoning as a significant aid in the process of knowledge acquisition was highlighted, and differences and common points between analogical and metaphorical reasoning have been dealt with.

In the next chapter, we will investigate the second component of the theoretical framework which involves the notion of community.

CHAPTER IV

ENCULTURATION INTO A DISCOURSE COMMUNITY

4.0 Introduction

While Chapter 3 dealt with the first theoretical concept of our study involving mental representation of knowledge and related issues, this chapter deals with the second theoretical concept, namely the concept of discourse community in general and academic and target discourse communities in particular. It discusses characteristics of a discourse community and how neophytes can be initiated to acquire domain-specific knowledge of their community through L2. Research on SLA with an additional dimension to acquiring knowledge of a particular community is reviewed and the implications of this for the present research are discussed. Then, the theoretical views on initiating new members into the academic culture are explored. The framework involved in planning the enculturation is outlined and it is stated that enculturation will take place in two contexts YADIM and the TDC by integrating the activities of the two communities. Finally, the chapter briefly mentions the issue of identifying *seeds* to be offered to neophytes during the acquisition process by utilising computer facilities.

4.1 The Nature of Discourse Community

One of the most widely recognised definitions of discourse community comes from Swales (1990) who defined it as a group of people who join together under a broadly agreed shared purpose and who have adopted mechanisms of communication between group members to achieve a shared objective. A discourse community has developed specialised lexis and has a reasonable number of experienced as well as novice members.

Prior to Swales' concept of discourse community, an earlier study of a discourse community is provided by Fish (1980) who identified a discourse community with a particular institution. In his work *is there a text in this class?* he develops a theoretical construct that identifies a discourse community which he refers to as an "interpretive community" with a particular institution of literary studies and with expertise embodied therein. According to Fish (ibid.), the interpretive community described as such is both a disciplinary and an organisational community. It is a disciplinary community in the sense that it provides "the rules of the game" (p:16) for both interpretation and communication in literary studies or otherwise. As

pointed out by Zappen (1989:3) it also provides the norms that are "relevant in relation to purposes and goals". This latter point is particularly important for it ensures that any utterance, literary or otherwise, will be interpreted from the perspective of a "shared basis of agreement" amongst the community members. It is therefore clear that it is the community itself that establishes the rules of the game as well as the shared meaning and shared understanding in relation to the discourse of the community which is established by the community members themselves.

Stenhouse (1991) states that the bodies of knowledge, which can be called academic disciplines or disciplines of knowledge mean that the disciplines of knowledge are not clearly described as areas of study or of knowledge, but metaphorically as communities of scholars who share a domain of intellectual inquiry or discourse. The discourse community shares the resources of a specialised language and a set of related concepts, through books, articles, research reports and a system for communication among its membership. Finally, it is an instructive community, as it instructs the new members with a specific knowledge, important topics and concepts of that particular discipline. This special subject knowledge has a correspondingly special subject language, that is, a language for a special purpose (Hutchinson & Waters, 1987) though such language is not a separate entity in relation to language as a whole. The distinction between general knowledge and knowledge of a special subject is not new as it has been known for some time. What is relatively new, however, is as Sager (1990:16) pointed out "the way we model special subject knowledge "a sub-space of the knowledge space".

4.1.1 Characteristics of a Discourse Community

Swales (1990:187) provides a more detailed definition of a discourse community in terms of the following characteristics.

First, a discourse community has broadly agreed common public goals, which may be formally documented or may be more tacit. People join a discourse community with a particular common goal and the communicative needs of the members tend to be the major factor in the development and maintenance of its discoursal characteristics. The next characteristics comprises a discourse community's mechanisms of intercommunication among its members, which may include meetings, correspondences and conversation, which distinguish one community from another. The fact that a discourse community utilises one or

more genres for communicative aims constitutes another characteristic. To Swales (1990:33), "genres are classes of communicative events which consist of texts themselves -spoken, written or of a combination and they refer to a distinct category of discourse of any type". These genres are specific to the community itself and as such become properties of a particular discourse community. However, genre and text display some distinct features.

There are different definitions of genre. Suter's (1993) use of the term "text type" corresponds to "genre", which he defines in relation to a speech community, as follows:

> A traditional text type is what a given speech community, at a given time and over a considerable period of time, accepts as a traditional, conventional and in some specific way linguistically standardised textual model to be constantly re-used for specific communicative purposes. Traditional text types are exemplary instances of grammatically and socially or culturally acceptable linguistic formats. (Suter, 1993: 48).

The definition of genre offered by Berkenkotter & Huckin (1993:476) is as follows:

> Genres are the media through which scholars and scientists communicate with their peers. Because genres are intimately linked to a discipline's methodology, they package information in ways that conform to a discipline's norms, values and ideology. Understanding the genres of written communication in one's field is therefore essential to professional success.

From the point of view of Biber & Finegan (1991:212), texts are "continuous segments of naturally occurring discourse", whereas genres are the text categories distinguished as textbooks, newspaper articles, public speeches, novels, abstracts, presentation, lectures, etc., which produce distinctive structural patterns such as problem solving, argumentation, etc. The types of genres which will be focused on for the present study include textbooks and articles on economics from a journal that the first year students are expected to read (in written mode) as part of their academic course requirements after they have entered the TDC. Lectures delivered in English constitute the spoken genre that they will be exposed to, which will not be analysed in this study. As stated earlier, discourse communities form in order to work toward sets of common goals. Familiarity with particular genres used in the communicative realisations of those sets of goals is one of the characteristics that members of a discourse community possess.

In connection with owning genres, a discourse community has acquired some specific lexis in the form of *shared and specialised terminology* containing technical and scientific concepts relevant to the particular discipline. Specialisation in a particular discipline involves acquiring specialist lexis, with their corresponding concepts to be utilised for the written as

well as spoken mode of communication to be able to operate effectively in the context of the TDC one has joined. The final defining characteristics is that a discourse community has a threshold level of members with a suitable degree of relevant content, mutual and shared knowledge, which indicates that a level of expertise is needed from the members in connection with specific knowledge of the community.

One major point common in the interpretation of Fish and Swales concerning discourse community is the idea of language as a basis for sharing and holding its members in common. Rafoth (1990), in conformity with this, maintains that one thing that most of the discourse communities have in common is the "sharing perspective". Besides this, the variable of acquiring genre knowledge is also crucial for membership in a discourse community. The written genre, therefore, plays a significant role in the operation of the discourse community. It is mainly through extracting information from these sources that the community members can gain access to scientific information. In relation to genre knowledge, Berkenkotter & Huckin (1993:500) state that "when we speak of genre knowledge in disciplinary and professional culture, we refer to knowledge that professionals need to communicate in disciplinary communities". Acquisition of genre knowledge is therefore crucial for effective membership of a community.

4.1.2 The notion of Academic Discourse Community

Academic discourse community or target discourse community are terms derived from the notion of a discourse community. Berkenkotter et al., (1991) characterised *academic disciplines* as "discourse communities" by pointing out that the existence of academic or professional communities can be inferred from the discourse that members of a disciplinary subspecialty use to communicate with each other. They maintain that in this sense, discourse that one group of like-minded people use defines the community and its ultimate products, as well.

Considering the characteristics listed above, DECOBA is an example of a discourse community in our study and since it is the target community that the neophytes are to join, it will be referred to as the TDC, hereafter. However, what is distinctive from Swales' definition of community is that DECOBA has chosen a foreign language, English, as a medium of instruction and as a vehicle for accessing domain-specific knowledge. Within the context of this particular community, subject area lecturers have the role of facilitating the

transmission of domain-specific knowledge to the new members - students - through various mechanisms, such as lectures, seminars, etc. Although the short-term objective of the community is to graduate students as qualified economists at the end of the four-year educational period with the ultimate aim of contributing to the well-being of the country, the long-term objective should be to increase the nation's competitiveness at the international arena and international scientific communities. The mechanism of communication among the community members, that is, the lecturers and the students is established by major speech events like students preparing projects and assignments. One important source by which information is supplied to these systems is through the written genre of course books on economics and journal articles. The main written genres expected to be consulted by the community members are listed in the curriculum of DECOBA and include Business Today by Rachman et al., (1993) and The Economics by Wonnacott & Wonnacott (1986). It is not the purpose of this research to go into genre analysis. However, in Section 5.6 of the thesis, the way these two kinds of genres are utilised in the knowledge acquisition process will be discussed.

4.1.3 The Notion of Shared Frame of Reference

The notion of shared frame of reference was discussed in relation to *frame theory*, in Chapter 3/Section 3.2.2. It will now be extended in relation to discourse community. Miles & Huberman (1984:20) claim that members of a community share "a model of knowing" which is encoded in the language that community members use which the incoming students need to learn. New members need to be familiarised with the language of a community through accessing the written genres and through interaction with faculty members as well as their peers. Lewis (1993) refers to the same idea stating that "one of the purposes of special fields of discourse such as that of science is to attempt to define all terms in mutually agreed ways, thereby generating a relatively highly developed mutual reference system which in turn maximises mutual intelligibility". (Lewis,1993:61).

What Miles & Huberman (1984) highlight in relation to *sharing* perspective seems to be in agreement with the view pointed out by Lewis (1993) above. Acquisition of discourse of a community involves acquisition of a frame of reference, that is, sharing elements within the frame of reference mutually agreed by the members of a particular discourse community, in our situation via L2. The area of overlap between new members and expert members of a discourse community is needed so that both groups can speak with each other using the same

linguistic terms. Mismatch between the new members and those of the expert members of a particular TDC in relation to a shared frame of reference can result in a breakdown in communication. As stated by Roe (1998) frames depend on the degree of sharedness among the participants in a discourse community. Since the dimension of sharedness for neophytes while at YADIM is non existent, it is important to create an environment in which they can acquire related frame of references via L2, as a prerequisite for knowledge acquisition and concept formation.

The neophytes' initial point of arrival into the TDC can thus be indicated in terms of their ability to interact effectively in mutually agreed terms on the basis of a shared level of understanding with the others who are already competent members of the community. Therefore, the next question we need to answer is: "How can a shared level of understanding between neophytes and members of the TDC be established?" Before proceeding with an answer, we need to review relevant studies conducted in SLA through socialisation, and later seek the implications of such studies in relation to knowledge acquisition via L2, with a particular reference to the notion of discourse community.

4.1.4 Second Language Acquisition (SLA) and The Notion of Community

In Section 3.7, the sharing perspective of language and knowledge was highlighted and it was argued that communication with other members of society is an effective way of acquiring social knowledge. Similarly, it was illustrated in the hypothetical model for domain-specific knowledge acquisition (see Figure 3.4) that neophytes' acquisition of domain-specific knowledge and the relevant frame of reference relative to the knowledge of their discipline can take place more effectively through peer interaction, that is, as they interact with other prospective members of the same community, on the basis of given tasks. Besides such an interaction, researchers working in the area of SLA, put forward the idea that interaction between the second language learners and those of the members of the target community can accelerate SLA (Schumann, 1976; Wode, 1981). Thus, they argued that there was a need for *socialisation*.

Schumann (1976), for example, has put forward the assumption that the greater the social distance between members of the target language and second language learners, the more difficult it is for the L2 learners to acquire the language of the target group. Similarly, Rogoff (1990) considers social interaction with members of the target culture part of the socialisation

process. Gee (1990) introduced the notion of "discourse apprenticeship" by which incoming students of any particular field need to be socialised into, or more accurately apprenticed to that field of discourse by taking classes and interacting with professors and other students who are more advanced in their studies. Language socialisation to Duff (1995) refers to "the process by means of which individuals, typically novices, are inducted into specific knowledge, beliefs, attitudes, roles, identities and social representations, which they access and construct through language practices and social interaction" (Duff, 1995:508). It can be assumed that the same assumptions highlighted above are valid for the acquisition of domain-specific knowledge.

There has been a great amount of research directed at understanding the process, particularly how writers are socialised into writing in an academic situation new to them (Faigley & Hansen 1985; McCarthy, 1987; Berkenkotter et al., 1988) as well as research into discovering the nature of academic conventions (Bazerman, 1981; MacDonald, 1987). These researchers have adopted what they consider a "social-contextual approach" (Bizzell, 1982b), an "outer-directed approach" (Coles & Wall, 1987) which attempts to familiarise basic writers with the conventions of university discourse and to emphasise what it is that students must learn in order to be members of a target community. Their focus of the metaphor such as *initiation* is related to what must change in students and "how they become other than they are in order to accommodate target discourse" (Bizzell, 1982a:299).

Socialisation studies described above take place when new members are actually involved and integrated into the activities of the target community and would have important implications for the acquisition of domain-specific knowledge, as will be discussed in the following sections. However, before discussing the implications of such studies, we need to introduce the notion of culture, with a particular reference to the notion of acquiring academic culture of a particular discourse community, the subject of the following section.

4.1.5 Culture in Relation to Target Discourse Community (TDC)

Although Swales does not explicitly refer to *culture* in his conceptualisation of the discourse community, culture is another concept associated with the notion of a community. Mehan (1980:131) defines culture in its general term as "the knowledge or skills that are necessary for membership in a society or community". Culture has been conceived as something to be

learned or acquired socially. It is also regarded as "a total way of life shared by people in a society. It is their customs, traditions, and above all, their values" (Liazos, 1989: 105).

Culture is therefore a way of life shared by the members of a particular community. These anthropological conceptions of culture as competence can be recapitulated in linguistic terms. Conceptualising culture within the boundaries of a particular academic community includes the notion of an academic culture, which, in relation to a particular TDC can broadly be conceptualised in terms of professional knowledge which may include knowledge of concepts and values unanimously agreed upon by the members of the community in the context of their functioning for their intercommunication. Language and culture are closely linked, since language reflects elements of cultural knowledge, that is, domain-specific knowledge of a particular discipline. Within the context of the present research, our main concern is related to an academic professional culture which includes concepts, the features of discourse which require an understanding of the particular academic values of a given community.

The notion of culture was also discussed in relation to schema and frame theories in Chapter 3. It was stated that the cultural background of students can result in different schemata for the interpretation of the same situation or event. Similarly, in connection with frame theory it was pointed out that different cultures may have slightly different frames for concepts like school, family and special celebrations, etc. It is true to accept that economists all over the world would belong to one culture. However, the analyses of TAPs which were used to trace cognitive processes of the neophytes while acquiring domain-specific knowledge have demonstrated that neophytes constantly referred to their *home* culture, that is, the culture of Turkey and the Turkish economy in interpreting the meanings of certain concepts. Every reference to Turkey and the Turkish culture in the TAPs shows that neophytes were arguing on the basis of their *home* knowledge, as the explicit references made by them "here in Turkey", or "we do not have unemployment benefit in Turkey" show (see Chapter 6/Section 6.6 for a discussion on the cultural frame of reference).

Since the acquisition of academic culture of their discipline via L2 is so essential for the well-functioning of the neophytes in their TDC, the next issue we are concerned with is how to initiate new members into the academic culture. The following section deals with the theoretical background concerning this subject.

4.1.6 Initiation into the Academic Culture

Although the transmission of domain-specific knowledge of an academic culture to neophytes might be considered as the duty of the faculty lecturers, the lack of cultural knowledge presents problems, particularly to those who are new to the community as will be discussed during this study.

Bizzell (1982b:5) has argued for the need to reflect on the connection between discourse, community and knowledge and maintained that special attention be given especially by way of "demystifying the conditions of knowing" - the conventions of academic discourse - which is certainly a difficult task since language and community are inextricably linked and that the culture cannot be separated from its language. She considers the concept of discourse community helpful in making the transition from one's present community into the target community, thus bridging one community with another. Studies were conducted in order to determine the nature of academic discourse through various needs assessments and task analyses as in the study of Munby (1978), Kennedy (1985) and several others (see also Bridgeman & Carlson, 1984; Horowitz, 1986). Similar needs analyses were carried out in relation to examination questions (Horowitz, 1986; Johns, 1986 and Dudley-Evans, 1988). Though such studies have contributed significantly to the existing knowledge on the types of tasks students must perform in their regular academic classes, it has been argued that they have failed to help students "engage in social cognition of the discipline that they are studying" (Johns, 1990). It was recommended by Perelman (1986) that an appropriate interaction is needed between students and the academic culture.

In the context of the studies described above, many scholars have observed that the task facing new students at a university is complex and demanding (Johns, 1990; Currie 1993), since they must come to terms with its cultural knowledge and be equal to the cognitive demands that the university imposes (Bizzell, 1982a, 1986); that is, they must become "pragmatically competent" within the academic culture, which has been defined by Mehan (1980:131) as "the knowledge and skills that are necessary for membership in a community". The task is even more problematic for non-native speakers of English, who study in a language in which their proficiency is still developing, especially when this language, non-native to them, is also the medium through which knowledge of their discipline is delivered in their TDC, as is the case for the students involved in the present study. In the context of our research, acquisition of domain-specific knowledge takes place through L2; it is not only the

acquisition of domain-specific knowledge via L2 but it is important to point out that neophytes are not yet perfect in the second language as their knowledge of English is still developing, and they are learning English and domain-specific knowledge at the same time.

The difficulties encountered by the uninitiated Turkish students in their TDC have already been explained in the initial data collection section (see Chapter 1/Section 1.5.3). To help such students succeed at university, as advised by Currie (1993), it is important to determine what the students will be required to do in their discourse community and how we can best prepare them to cope with such requirements. Thus, if students can be provided with *sine qua non* conditions before they are initiated into their TDC, we may be able to help them access domain-specific knowledge more efficiently after they have become members of their community. Without such initiation as argued by Bizzell (1982a, see also Bizzell, 1982b), students become "restricted members" of their community.

It can be concluded from the above discussion that if we were to initiate new members into the academic culture, we need to explore the community's values and the nature of academic discourse, hence, we need "to demystify" the academic discourse, in the words of Bizzell (1982a) by a process of *enculturation,* a similar process to socialisation, without which the acquisition of domain-specific knowledge can not take place. The process of enculturation will also unite the academic discourse community and the community of YADIM. The enculturation process would also offer an answer to our first research question which asks: "How can one, in practice, go about establishing prerequisites, *sine qua non* conditions of knowledge acquisition and concept formation via L2 in a Turkish university?"

Initiating the prospective members of DECOBA into their community will therefore be done through enculturation, which will be dealt with in the following section.

4.2 Enculturation

Enculturation, in general terms, is defined as "the process of acquiring the existing culture" (Shimahara, 1970:143) which, in the preceding section has been defined as concepts and discourse of the discourse community in question. Goodman (1967) views enculturation from a macroscopic and a microscopic perspectives, which seems to fit quite nicely with the plant metaphor to knowledge acquisition introduced in Chapter1/Section 1.2, stating that "the child, in learning the culture of his society, conforms in response to pressures of a more or less

insistent and forceful sort. But he also resists, evades, selects, and experiments. He becomes a member of his society, but the process is a creative becoming" (Goodman, 1967:145).

This process to Goodman (ibid.) is twofold: the creative modifying of culture - in a microscopic sense, and the creative adapting to it - in a macroscopic sense. For the neophytes, these micro and macro processes might be conceptualised in terms of two levels of developments. In a *microscopic* sense the individual's cognitive structure grows out of the ways in which s/he interacts with the various levels of input which can be linked to the *seeds* in the plant analogy which provide the nourishment for the development of concepts. In a *macroscopic* perspective, the individual becomes adopted to the target culture, as a result of this interaction and the process of conceptual development by acquiring new knowledge structures, that is, schemata, frames and scripts. For all these to happen the individual needs to experience a process of enculturation. Goodman's perspective would also suggest that the organisation of language learning means the organisation of enculturation experiences in a particular context and community.

Enculturation and socialisation are two related concepts, the former is used as an operational construct for the understanding of the cultural process and its genesis with an anthropological application, while the latter is generally used in the sociological sense. Though the two constructs are often used interchangeably, Spindler (1968) distinguishes enculturation from socialisation stating that "socialization and enculturation are not identical constructs as I use them. The former includes the assimilation of the individual to the group or groups, of which he is becoming a member. To become so assimilated he must be enculturated in some degree, but much of his interaction with others in the group is not specifically culturally determined" (Spindler, 1968:3).

Socialisation denotes the process by means of which the culture is transmitted from one generation to the next so that people become competent members of their community. The acquiring of culture is broadly referred to as *enculturation*. Herskovits (1964) who has given one of the most analytical definitions for enculturation, regards socialisation as part of the entire process of enculturation by means of which "men *adjust* to their fellows in working with the total body of traditions" (1964:326). Herskovits goes on to state that enculturation in adult life "opens the gate to change, making for the examination of alternate possibilities, and permitting reconditioning to new modes of thought and conduct" (p:327). Similarly,

enculturation is expected to lead to a change in the conceptual development of the neophytes at macroscopic level.

Socialisation has been conceived as *cultural learning* in which the values, knowledge, attitudes, skills and expectations of a particular culture are acquired by the initiates (Corcoran & Clark, 1984). At the same time the culture evolves as it is shaped by the interaction of newcomers and "the culture bearers" (Kuh & Whitt, 1988), i.e. members of the community. Bess (1978) considers the reciprocal nature of this "cultural learning" process when the newcomers integrate, to some extent, their own needs and values with what they perceive to be the institution's "norms and values" are also integrated. As learners travel from one community context to another, whether that be from home to school, from high school to graduate or professional training - they must master new ways of speaking, reading and writing, ways that are appropriate within each community (Tierney, 1988; Boice & Thomas, 1989). This view has important implications for the present research.

From the discussion above it seems obvious that enculturation is a more general term, while socialisation is a more specific term in which socialisation can be considered as part of enculturation. It is the process by which the individual adjusts to the reality of the community; it includes such things as recognition of his/her roles, etc. mainly by being an observer of and participant in the ongoing life of the community in which s/he participates, as well as acquiring knowledge of the new community.

Enculturation has been studied through socialisation in SLA studies, as described in the above section. Our choice for the consistent use of *enculturation* throughout the present study is due to the fact that enculturation will be conducted partly at YADIM where neophytes will be familiarised with the culture of their discipline and partly at DECOBA by taking part in the lectures offered through L2. Therefore, taking the implications of the socialisation process into account a process of enculturation will be initiated by which the neophytes will be given opportunities under which their acquisition of domain-specific knowledge can be facilitated while they are undergoing the process of transformation at the language centre so that this socially accumulated stock of knowledge can act as a frame of reference to facilitate their functioning more effectively in the TDC. Enculturation for our study also denotes the process by which the academic culture is acquired by the neophytes who are to join their TDC to enable them to be capable of meeting the expectations of the lecturers, and to talk on the same

level of *shared experience* with them. In addition, to participate effectively in their academic community, students must accumulate a stock of academic knowledge in order to be accepted as "threshold members" (Swales, 1990).

In view of the debate above, acquisition of domain-specific knowledge for neophytes can be considered as an integral part of their enculturation process from three perspectives. As confirmed by Saville-Troike (1985) language is part of a culture, that is, knowledge of a particular discipline. Secondly, language, here L2, is the medium through which domain-specific knowledge will be acquired. Thirdly, languages, both L1 and L2, are tools which novices use in exploring the knowledge of their specialism and establish their status within the target context. Learning a particular language entails learning the cultural values of that language, whether first, second or third, as stated by Saville-Troike (ibid.). Similarly, acquiring domain-specific knowledge would entail acquiring the cultural values of the discipline in question.

Before dealing with how shared understanding (see Section 4.1.3) can be established, we need to point out what might be experienced during the enculturation process. During the process of enculturation into a new community, the new members are likely to experience certain changes under the opportunities provided. Individuals moving from one community to another will have to adjust to new knowledge structures, norms and lexis, the shared understanding established within the community through various changes occurring at the cognitive level of development as described in Section 3.4.3 in connection with the notion of assimilation and accommodation, as suggested by Piaget.

Since the enculturation process may require some kind of a change in the learner's conceptual system, this change may not always be a pleasant experience on the part of the learners. Johns (1990) mentions the "adjustment difficulties" that the requirements of university classes impose. Change might therefore suggest some period of adjustment. Moreover, during the process of enculturation, newcomers may experience a sense of disorientation or foreignness in the new community as "contrasts are generated" (Rosch & Reich, 1996) and a kind of sensory overload might be experienced, described by Hughes (1985) as a "reality shock". Chase (1988) draws three categories, according to which such changes may be resisted, opposed or accommodated. *Accommodation* in this context is used to refer to the process by which the students learn to accept conventions and normal progression of learning. Due to

these reasons, this change needs to be a gradual process whereby the cultural values are introduced to neophytes gradually which would not upset their biological make-up.

As stated earlier, communication among the members of a particular discourse community can be achieved when there is convergence or overlap, sharing or matching between experts and new members over the concepts of a discipline. Since the dimension of sharedness for neophytes is non-existent, the next question to answer is: "How can we establish a shared level of understanding between neophytes and members of the TDC?" Before proceeding with an answer, we need to reiterate the characteristics of these learners. The learners, in the scope of our study, are not yet members of their TDC, but they are qualified to join an academic community which happens to use a different language, English, from that of the native one, after having completed the language programme. The following section deals with establishing shared understanding.

4.3 Establishing Shared Understanding

Bazerman (1988) maintains that the achievement of shared understanding can be examined in two different kinds of situations, both of relevance for scientific communication; as when "one is an outside member of the community" as well as when "one is within the community" itself (Bazerman, 1988:186). The first point to take up is of the neophyte becoming familiar with knowledge already shared within a community, which Bazerman illustrates with an example of a new member of an economics community. He refers to neophytes as "beginners" and points out that a kind of negotiation goes on between the beginner and an accomplished speaker, until the beginner produces an utterance recognized as bearing meaning within the socially shared system. According to this view, students' expertise in relation to their scientific communities increase in the course of time; not only does their technical vocabulary expand, so does their range of contact with the subject materials textbooks, classroom discussions and their ability to manipulate these materials in congruence with the formulations of their disciplines. Bazerman (ibid.) claims that in this way the neophyte gradually becomes familiar with the system of the community and will develop "the script and schema appropriate to participation in the community" (Bazerman, 1988:307). Thus, what he later refers to as "the apprentice economists" will think like economists, such that when they encounter some economics material they will perceive it through the acquired framework accepted by economists.

To Bazerman (ibid.), the second kind of situation in which the shared understanding can be established is when one is an outside member of the community, which reflects the case of the present research. In this situation, change and growth need to occur in conformity with the system of understanding already shared by fully socialised members of the community. It is this second kind of change, which we are concerned with. Though Bazerman does not say much about how this can be achieved, for neophytes while undergoing language training, enculturation can be established and planned partly at the language centre and partly at the TDC, by means of integrating the activities of the two communities, as will be described in the following section.

4.4 Planning the Enculturation Process

In Section 4.1.1, genre was defined in relation to the written aspect of domain-specific knowledge, to which spoken genres will be added as "typical forms of utterance" (Bakhtin, 1986:63). Bakhtin (ibid.) argued that genres and other forms of verbal communication should be studied in their "authentic environment of an utterance, the environment in which it lives and takes shape, filled with specific content and accented as an individual utterance" (1981:272), which can be fully understood and appreciated only by observing "insiders". Since part of the aim of our research is to create conditions under which acquisition of domain-specific knowledge can be facilitated, it is considered important, to give neophytes opportunities to observe the insider's view of the lectures, a form of spoken genre. Since genre knowledge is considered as a form of "situated cognition" (Brown, et al., 1989) from a sociocognitive perspective, genre knowledge of academic discourse entails an understanding of both oral and written forms of appropriate communicative behaviour. This knowledge, rather than being explicitly taught, needs to be acquired through enculturation as neophytes become enculturated to the ways of acquiring the knowledge in particular disciplinary communities.

Therefore, in addition to the enculturation studies at YADIM, visits might be paid to DECOBA with neophytes acting as *participant observers*. Berkenkotter & Huckin (1993:477) consider such an activity as one way in which learners can "acquire and strategically deploy genre knowledge as they participate in their field's or profession's knowledge-producing activities". In our case, however, attending lectures is mainly a *receptive* activity. As outsiders yet to their community such participation might involve a form of "situated cognition embedded in disciplinary activities" (Berkenkotter & Huckin,

ibid.). It can also be argued that within the enculturation process, effective acquisition and concept formation can take place in as much as learners perceive themselves as belonging to and engaged in that context and community. As complementary to studies at YADIM, the enculturation process will be extended to attend the disciplinary activities of the TDC, that is, lectures as one of the significant mechanism of communication between expert members and novices, which would help neophytes acquire concepts of their discipline, thus acquisition of domain-specific knowledge and enculturation will take place simultaneously.

Berkenkotter & Huckin (1993) complain that students are often asked to use the tools of their discipline and function in their discipline without having been able to adopt its culture. We will refer to them as *non-enculturated learners* (see Chapter 5, for details). We believe that to learn to use tools as expert members use them the neophytes must be enculturated to the values and culture of the discipline while undergoing the transformation process at YADIM. Such an enculturation is hoped to produce a smooth transition which would facilitate their adoption into the target culture with ease and a minimum level of hardship.

Bazerman's first view of establishing a shared level of understanding is not beneficial for the present research. Once learners are in their TDC attempting to enculturate them would be too late. Therefore, it can be argued that it is crucial to plan the enculturation process prior to their becoming members of the TDC. Enculturation needs to be carefully and systematically planned. For example, starting with the written genre, a section from a textbook would be extremely intimidating and demotivating and even off-putting in the case of neophytes with no knowledge of their target discipline. It would be demotivating, because as stated by the authors of these genres, they are intended for university students, not for Turkish students. Moreover, the neophytes' level of proficiency in L2 would inhibit their acquisition of domain-specific knowledge via L2. Therefore, this intimidation could greatly be overcome by offering them concepts of the target discipline and helping them gradually acquire and integrate these concepts into their knowledge base. It is only then that they could be introduced to a larger section of the genre. The details of this process will be discussed in Chapter 5.

Complementing the above view would be participating in the culture's activities by joining the lectures in the target context so that acquisition of the domain-specific knowledge could be enhanced and accelerated by providing neophytes with repeated opportunities to actively experience real-life language interaction, as pointed out by researchers in L2 acquisition

(Schumann, 1976; Wode, 1981). In order to accelerate the acquisition process and give learners an opportunity for social interaction with lecturers and the first-year undergraduates, visits will be arranged. In order to help neophytes acquire fundamental concepts of their domain, the next issue to deal with is how to identify concepts within running text of economics and business studies which point to those concepts.

Establishing a *shared frame of reference* while neophytes are not yet members of their TDC raises the need for the existing programme of YADIM to be revised and certain changes to be made. When such a revision is made, one needs to ascertain what should be offered to the neophytes in the most economical and efficient way. One should establish the nature of the knowledge required. In Chapter 3 of our thesis, it was stated that knowledge is represented in the mind by schemata, frames and scripts and concepts are part of a schema or a frame, and words are pointers to concepts. Moreover, shared experience is highlighted in Section 4.1.3 of this chapter. To explore more particularly the relationship between areas of experience shared by members of the community and the shared signs, that is, the linguistic realisations of those shared signs, one needs to establish a corpus of economics and business texts which will be read when neophytes have started their TDC and become members of their community, in order to identify important concepts which are represented by lexical items. We need to establish such a corpus in order to identify statistically what the main concepts are as evidenced by the lexicon. Thus, the corpus would help us identify the *frame of reference* needed.

The initial part of identifying the concepts, as described in the present study, will be brought to the attention of the neophytes through using computer facilities with efficiency and reliability, as will be dealt with in Chapter 5. It has already been mentioned in relation to the lexical syllabus (see Chapter 3/Section 3.8.3) that identifying important words for a particular group of learners has been greatly enhanced by computer-driven analyses. As has frequently been suggested, one must concede that scientific language involves more than lexis or key concepts. There are other features too, such as discourse patterns, syntax, stylistic features, nonverbal information, diagrams and tables. However, our main concern has been to identify concepts, since understanding fundamental concepts in the domain of economics and business studies has already been discovered as a major problem during the initial data collection stage (see Chapter 1/Section 1.5.3). In addition, in our research, the plant analogy has been used to illustrate knowledge acquisition and concept formation, and it has been stated that the basic

requirement needed by the plants for their growth and development is the *seed*. The seed for the growth of knowledge will therefore be identified on the basis of the corpus by using computer facilities. The methodology section explains the generation of a computerised corpus to be utilised in the knowledge acquisition process.

4.5 Summary

This chapter was concerned with describing the second variable in the theoretical framework of our study, namely the notion of discourse community and how neophytes can be enculturated into their TDC. It has been pointed out that DECOBA is an example of a TDC which neophytes will join having completed their language training programme at YADIM. In order to help them have a smooth transition into the respective community and help them reach shared level of understanding with the expert members of the community via L2, a process of enculturation has been planned which will take place partly at YADIM and partly at DECOBA so that the two communities could be united. It has also been stated that the data needed to initiate this process will be obtained via creating a corpus of economics and business texts which will provide the seeds needed for knowledge acquisition and concept formation through L2. Before describing the appropriate research design and the methodology, which the next chapter deals with, the research hypotheses are reformulated as follows.

4.6 Reformulating the Hypotheses

The previous two chapters of the investigation have laid the theoretical foundation of our study. Acquisition of domain-specific knowledge can only be valid in that it satisfies discussions in the previous two chapters. In the light of the discussion so far, the three research hypotheses addressed in Chapter 1 are re-formulated as follows:

It is hypothesised that when neophytes are given a concept embedded in co-text which is identified on the basis of the corpus, it will trigger an association of schemata, frames and scripts in their mind, which will eventually contribute to building up a mental picture in relation to knowledge of their specific domain.

The second hypothesis is related to an attempt to enable students to feel the sense of community, that is, the circumstances under which knowledge acquisition can be established. It is hypothesised that acquisition of domain-specific knowledge and concept formation can

only take place within a community of learners with shared interest and purpose and thus certain conditions need to be established for acquiring domain-specific knowledge. If these conditions are satisfied, in other words, if a community of learners can be established sharing the same interest and purpose, we will expect to see a successful learning programme with regard to knowledge acquisition and concept formation, for neophytes who are as yet outside members of their community.

The final hypothesis will be related to observing developments of this growth. It is hypothesised that neophytes, being outsiders to their TDC, will initially start with a general frame of reference, that is, every day knowledge, due to their unfamiliarity with domain-specific knowledge. With repeated exposure to input, their frame of reference will be consistent with those of the expert members of the TDC.

While this chapter dealt with the second theoretical concepts of our study, the next chapter is concerned with establishing the research design and the methodology. We propose to build our argument in the next chapters upon the theoretical concepts highlighted in this and the previous chapter (Chapter 3).

CHAPTER V
RESEARCH DESIGN and METHODOLOGY

5. 0 Introduction

This methodology chapter deals with the design and implementation of the study so that the problems identified at the onset of our research could be minimised. First, the context of the research is described and the research design is introduced. Then, different methods which were used throughout the research are outlined. The chapter further deals with the establishment of a corpus to be utilised during the knowledge acquisition process. The components of the enculturation model are illustrated. Finally, the methodology for analysing the processes in knowledge acquisition and determining the product of what has been acquired is introduced.

5.1 The Nature of the Research

strict and rigid adherence to any method, technique or doctrine position may for the individual fieldworker, become like confinement in a cage. If he is lucky or very cautious, a fieldworker may formulate a research problem so that he will find all the answers he needs within his cage. But if he finds himself in a field situation where he is limited by a particular method, theory, or technique he will do well to slip through the bars and try to find out what is really going on". (Wax 1971:10).

Thus, the method we followed was one of using multiple strategies explained by Burgess as:

I suggest the term multiple strategies to allow the researchers to use a range of methods, data, investigators and theories within any study and so overcome the problems of bias. However, in using this term I have a further aim; that is not to see different approaches used alongside one another but also to see them integrated within the course of an investigation.
(Burgess, 1984:146).

The present research utilised multiple sources of data collection methods in which various combinations of research devices were employed in order to create an orderly account of data from multiple perspectives and to obtain what Geertz refers to as "thick description" (1973:6), that is, a more detailed picture of the cognitive processes of knowledge acquisition and concept formation through a foreign language. Although the major source of data was collected by TAPs, the motivation for utilising various other methodological tools was to contribute to this central objective.

5.2 Context of the Study

The research was conducted in two contexts; YADIM, the language centre which constitutes the host community where neophytes receive language training, and DECOBA which constitutes the target community or the TDC into which neophytes will be admitted having completed the programme at YADIM.

Amongst the several TDCs at the University of Cukurova, the research context for our study has been DECOBA. The main reasons for this particular choice can be put forward as follows:

1. The present research is the extension of the previous research, (see Kırkgöz, 1993 for details), the results of which gave empirical evidence that problems existed which prevented community members from accessing domain-specific knowledge efficiently, particularly for the new incoming students at the faculty, that is, the first-year undergraduates. Therefore, further research has been undertaken to uncover the underlying reasons for this problem and develop a model of research whereby better provision can be made at the language centre.
2. DECOBA is the first English-medium department established within Çukurova University and it has been considered to be better established in terms of its curriculum and community rules as well as the provision of English-medium instruction.
3. Finally, the fact that we, as the researcher of the present investigation, were familiar with the subject of economics due to our background education was a further advantage for choosing this department.

5.3 Reintroducing the Research Questions

Based on the theoretical framework established in Chapters 3 and 4, an attempt is made to answer the following research questions throughout this investigation.

1. How can one, in practice, go about establishing prerequisites, *sine qua non* conditions of knowledge acquisition and concept formation in L2, in a Turkish university?
2. How can one best arrange to make visible what is going on in the learners' minds?

The methodology developed to answer the first research question involved establishing an enculturation process, as will be descibed in Section 5.8 of this chapter, whereas the methodology developed for the second research question involved analysing the TAPs which helped us find out what kind of mental processes were taking place during knowledge

acquisition. In addition to TAPs, written recall protocols were used to determine the product of what was acquired, and questionnaires, diaries and examinations were utilised as supplementary devices. Since the previous two chapters were devoted to investigating the theory underlying our research, now we introduce the methodological framework which is designed to offer answers to the research questions addressed above with the purpose of illustrating the methodological procedures which would lend themselves best to the neophytes' acquisition of domain specific knowledge. In the following section, research design is introduced and each step followed is explained.

5.4 Introducing the Research Design

The research is designed as "a small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention" (Cohen & Manion, 1991:217). It is *intervention* in the sense that the research aims to promote conceptual developments in neophytes by helping them acquire knowledge of their target discipline and then explore and monitor the effects of this at DECOBA, the real world context. The present research is designed as a two-stage model, *enculturation* and *post-enculturation* stages, in which the prospective members of one academic community are enculturated.

Preliminary investigation and fact finding: Prior to embarking upon the present research, a preliminary investigation was carried out into the research area in order to identify the specific problems, as discussed in Chapter 1. Through needs analysis involving two data collection techniques, namely questionnaires and interviews, the difficulties of the first year undergraduates while acquiring domain-specific knowledge at DECOBA and the expectations of lecturers were identified. The analysis of the interviews and questionnaires made us decide on the research topic. It was discovered that the lack of domain-specific frame of reference on the part of the students, was a major problem for them in accessing domain-specific texts. As a result of this finding, a specialist corpus was established based on the genres, mentioned in Chapter 2, which the first year undergraduate students were expected to read.

Stage One: Enculturation: Enculturation corresponds to the pedagogical side of our investigation, during which empirical research was initiated in order to create conditions conducive to the acquisition of domain-specific knowledge at YADIM. A detailed description of the enculturation model will be provided in Section 5.8 of the present chapter.

Stage Two: Post-enculturation: This is the final stage in the research design. It involves monitoring neophytes' performances at DECOBA through recall protocols, examinations and collecting diaries. This stage took place after the neophytes were initiated into their faculty, having completed YADIM.

The stages followed in the research design will be elaborated below:

5.5 Initiating the Research

Prior to embarking on the initial data collection, the written official permission of the administration at YADIM for the implementation of the research was requested and obtained. Similarly, the framework of the research project was proposed to the dean and the lecturers in DECOBA and the official approval to carry out the research was obtained which corresponded to the same date. The enculturation stage of our research was implemented during the Academic Year 1994-95, while the post-enculturation during the following academic year, 1995-96.

In order to investigate the nature of the problem at the TDC, two methods (described in Chapter 1/Section 1.5), interviews and questionnaires were used to uncover the perceptions of community members, both lecturers and the former neophytes or non-enculturated learners.

The following major reasons can be put forward for employing these two methods:
Questionnaires and interviews enable the researcher to understand the community members from their own perspectives of the reality in their natural context and "get to know them personally and experience what they experience in their daily life" (Taylor & Bogdan, 1984:77) as the "insider members" (Petro & Petro, 1970; Ramani et al., 1988), and in their natural context (Cohen & Manion, 1991; Miles & Huberman, 1994). Secondly, as claimed by Bizzell (1982a) and Johns (1990) "to demystify disciplinary cultures". Due to the afore-mentioned reasons, both data collection methods were utilised as a preliminary investigation into discovering the non-enculturated learners' problems, while accessing domain-specific texts and the nature of reading required in the target context, DECOBA. Another objective was to obtain these non-enculturated readers' perspectives in an attempt to gain insights into how they viewed their experiences having completed the transformation from YADIM without experiencing enculturation into the TDC. It is often claimed that questionnaires contain some subjectivity (Oppenheim, 1996). In order to counterbalance the possible disadvantages of the questionnaire, interviews were held.

The initial needs assessment section of our study provided the evidence and motivation for the need to embark upon the actual research. It was evident that all members of the TDC shared similar expectations; they requested that conditions be provided under which acquisition of domain-specific knowledge could be facilitated before to neophytes started their academic classes. It was also revealed that students entering the university for the first time face many problems associated with arriving at a new learning environment and for those at DECOBA these problems are compounded by having to learn their domain-specific knowledge through the medium of English as a second language. Studies conducted in other parts of the world reveal that such difficulties are not unique to Turkish students alone, yet, they have far-reaching implications. Similar difficulties were also found by Hewings (1989) and Fisher (1990) in their research with students studying economics in English. Hewings (1989) in her study at Birmingham University with native speakers of English intending to follow their academic courses in economics, reports findings of alienation and frustration caused by the lack of domain-specific knowledge.

The next phase of our research involved literature review to find out more about such issues as knowledge acquisition, structure of knowledge in the mind, the notion of discourse community and how the neophytes can be prepared to acquire concepts of their discipline (see Chapters 3 and 4). The related literature review was followed with the collection of what Swales (1990) refers to as "tangible bits", the written genre of economics textbooks and relevant parts of the journal articles, which the first year undergraduates at DECOBA are required to read in order to identify concepts as evidenced by lexical items. Based on the collected texts a specialist corpus was created to identify the range of lexis valued by the community members.

5.6 Establishing a Specialist Corpus

This section first gives a brief description of the stages involved in establishing the specialist corpus of economics and business texts, then it deals with how the corpus is explored in order to identify lexis pointing to important concepts to be offered to neophytes during enculturation.

The two types of genres which were used in our corpus establishment include first, the relevant sections from the two coursebooks *Economics* by Wonnacott & Wonnacott (1986) and *The Business Today* (Rachman et al., 1993) and the second genre included 30 of the

selected articles related to the economics section from the journal the *Economist* that the first year undergraduates are expected to read as their academic course requirements after they have entered the TDC. Before putting the texts into the computer, the written permission from the editors of *The Economics* and *Business Today* as well as the consent of *the Economist* journal were obtained. Then, the selected texts were scanned, fully edited manually, correcting misspellings, etc., in order to create a "clean text" (Engwall, 1994). The edited texts were stored in the ATA (Aston Text Analyser) to continue with the processing of the corpus. The size of the corpus consisted of 202.389 running words and 20.107 types, i.e. identical tokens. As the first stage in processing the corpus, lexical frequency list of non-grammar words, giving the statistical information on the number of times a particular lexical item occurs, were produced for the entire data. For this purpose, we identified 75 non-grammar content words, as they bear the main information load in expressing the concepts of the TDC. It was also confirmed by Sinclair & Renouf (1988:25) with reference to lexical syllabus that corpus based investigation offers learner "only things worth learning".

5.6.1 Identifying Shared Frame of Reference

The next stage involved in corpus processing was to identify *the shared frame of reference*, highlighted in Chapter 4/Section 4.3 of the present research. For this purpose, it was important to find out how a particular "seed" (Hales, 1995) or the "key word" (Roe 1998) collocated, how it tended to "chunk" (Skehan, 1992). In other words, we looked at the key word and "the company it keeps" (Firth, 1957). A key word, as defined by Roe (1998) is a word that occurs significantly in the whole corpus, in which the significance is determined according to the frequency of the occurrence of the word in the whole corpus. The objective in identifying collocations was to compile a list of collocates "recurrent word combination" (Cruse, 1986:40), significantly co-occurring with a given key word within a specified linear distance called span. Thus, the *synoptic profile* in the ATA's concordancing package was used which provided the frequency of occurrence of the "significant collocates of a word" (Sinclair & Renouf, 1988; Leech, 1991).

In the synoptic profile, the individual items are accompanied with their own frequencies of occurrence. The following table shows a synoptic profile of cost as the *seed*, from which collocability at positions -4 to +4 on either side can be inspected.

cost

5 and	7 the	17 its	30 opportunity	*	38 of	10 capital	6 is	5 and
7 to	9 of	17 its	25 average	*	39 curve	12 the	9 the	10 the
4 but	5 it	6 and	22 the	*	15 curves	8 of	6 is	5 capital
2 been	3 point	2 assign	2 firms	*	2 equals	3 upward	3 to	2 given

Table 5.1 A Synoptic Profile of "cost"

In the synoptic profile presented above, the key word, cost is represented by the symbol * and the significant right hand collocate of *cost* is *opportunity*, with 30 occurrences, thus forming the concept of *opportunity cost*. Hence, the synoptic profile enabled us to identify the combinations of chunks representing concepts which are central to community members and provided the frame of reference shared by members of the TDC. This analysis was carried out for all of the selected non-grammar words.

5.6.2 Identifying Concordances of Recurrent Words

The next step performed was to produce a concordance list containing domain-specific collocates of the key words identified. The main advantage of concordances is that it provides sets of collocates which play an important role in the TDC members' mental lexicon and are representative of their collocational repertoire. In addition, concordance lines provide numerous examples of a concept in co-text, which is defined as consisting of those sets of words on a concordance line as well as in a written or spoken text which immediately precede and follow the word in question (Lewis, 1993; Roe, 1998). In relation to corpus studies, Moon (1987) maintains that for most words 50 or so characters that appear on either side of the key word, are sufficient to resolve ambiguity in meaning, hence they are sufficient for "disambiguation". However, as will be discussed in Chapters 7 and 8, our research findings have demonstrated that this is not necessarily true in the case of concepts such as *opportunity cost, perfect and imperfect competition,* where concordance lines do not provide sufficient information for disambiguation.

In Chapter 1 of the present research, *macroscopic* and *microscopic* aspects of knowledge acquisition were highlighted. Identification of the key concepts by means of corpus analysis has met the criteria of the microscopic aspects. As has been explained in the formulation of the research hypotheses, we assume that numerous examples of a concept given in co-text will accelerate the acquisition process. The main justification for us to focus on the shared frame

of reference (domain specific collocates) can also be attributed to the objective of our study. Our choice for lexical analysis is motivated by questionnaire and interview results. As revealed from the interview and the questionnaire results carried out at DECOBA (see Chapter 1) words and the lexical units created serious confusion among non-enculturated learners in accessing the domain-specific texts. It was stated by students during the interviews we held with them that they interpreted collocations by activating non-economic sense of its each constituent. In the case of *interest rate*, for example, each constituent of the collocation was interpreted separately and interest was activated in the frame of *being interested in something*. Therefore, there was a good reason for us to identify domain-specific collocates, since in the case of collocates it is not the meaning of a single word but collocation as a whole that gains meaning. A further justification can be accounted for by the fact that in the literature the question of how knowledge of a discipline can be acquired through the use of concordances has not yet been investigated.

The creation of spec.corpus has enabled us to take guesswork out of our investigation, identify the collocational patterns and produce a bank of "authentic examples" (Sinclair & Renouf, 1988; Leech, 1991; Polezzi, 1994) of the language of economics and business studies. It has been stated in relation to discourse community that a discourse community generates its own lexicon. In the present corpus examined and analysed, we have found that key concepts in the domain of economics and business studies come in *single word or single lexical units* such as barter, specialisation and monopoly, in *compound forms* (Salager, 1984), as in opportunity cost, double taxation and scarce goods, all forming domain-specific concepts and constitute "the elements of knowledge" (Sager, 1990), and in the form of *abbreviations* such as GNP. Based on the research findings, it can be concluded that concepts are not labelled by single words but may also correspond to chunks or even abbreviations. In the present corpus, the percentage of concepts which occur in single form was 28 %, and 70% of concepts were found in compound form, while 2% in abbreviations.

The figure below displays the stages involved in creating spec.corpus.

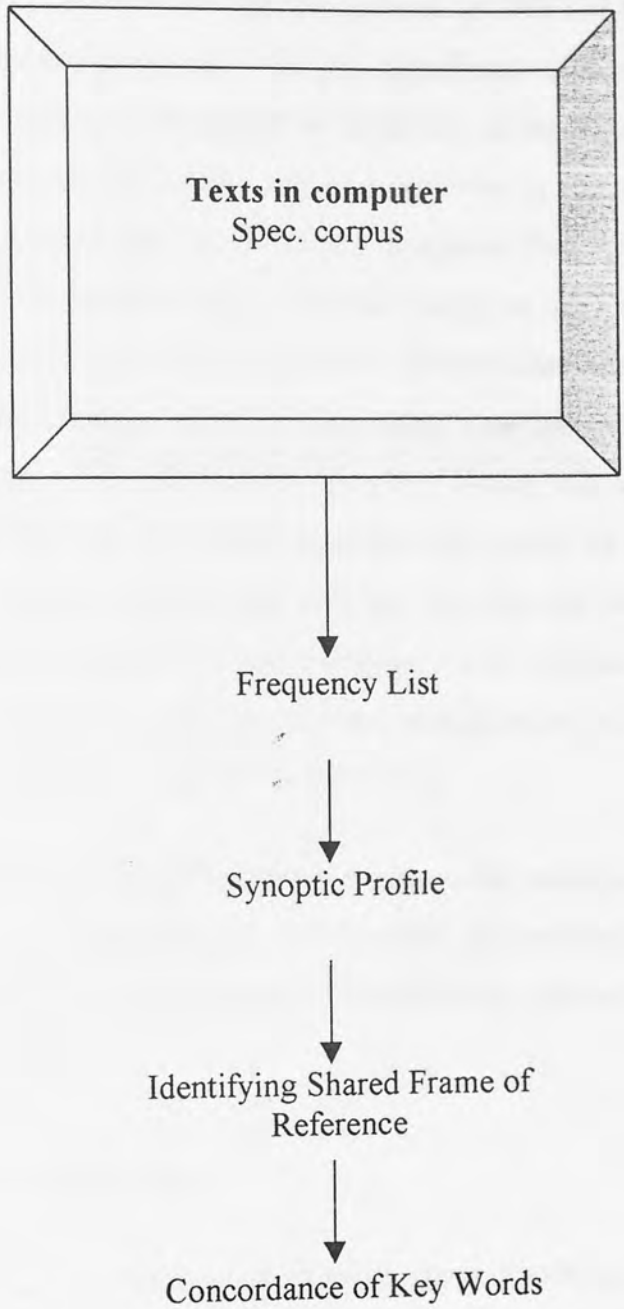


Figure 5.1 Stages in Creating the Spec.corpus

The following section explains the pedagogical utilisation of these knowledge carrying elements, which are offered to neophytes in the enculturation process.

5.7 Pedagogical Utilisation of Corpus

The next stage in our research involved sequencing the key words with concordance citations. As discussed in Section 3.8.1.1 of the thesis, one important issue in course design is the order in which language items are sequenced. The order in which neophytes were introduced to the

concordance of the key words was by means of a *matching process,* that is, the key concepts to be learned in the first week of the programme at DECOBA were identified from the textbook and those particular words with their significant collocates were selected from the spec.corpus to be introduced to neophytes at YADIM. In the sequencing, there was a gradual progression in the complexity of the concepts included in our programme. For example, *economics, household* and *scarcity* were the concepts that the first year undergraduates learned during the first week of their academic study, so they occupied the first orders in sequencing the key concepts in our programme. On the other hand, *opportunity cost, perfect and imperfect competition and collective bargaining* were more complex concepts, thus they were the final concepts to be offered to neophytes. Hence, the weekly programme followed by the lecturers and thus the significant concepts highlighted by the textbook were matched against our data. Such a selection and ordering has met the three criteria put forward by Moon (1987); "utility, complexity and coverage" and enabled us to have a reasonable coverage of the concepts to be included in our enculturation studies. The outcome of this procedure will be explained in Chapter 7 of the thesis.

The preceding section dealt with identifying fundamental concepts with related collocates on the basis of the spec.corpus established, with the aim of providing what Roe (1994) considers "life-support" mechanism to our learners. The following section deals with the components of the enculturation model.

5.8 Planning the Enculturation

As stated in Section 5.3 of the present chapter, the methodology which was developed to answer the first research question involved setting up favourable conditions under which acquisition of domain-specific knowledge could take place by a process of enculturation. Analyses of the preliminary needs assessment demonstrated that in the absence of enculturation, prospective members of DECOBA faced difficulties in adapting to the culture of their community. Therefore, there was a need to ensure that appropriate provision has been made for these new members to facilitate their acquisition of domain-specific knowledge which would eventually enable their smooth and gradual passage into their faculty.

To initiate the enculturation process, it was necessary to establish a community of learners consisting of prospective members of DECOBA. Knowledge acquisition can only take place under favourable circumstances because participation in a community cannot be forced, it can

only be induced by mutual consensus, based on the sharing perspective, as related to Swales' (1990) notion of discourse community. Since it is only people with shared interest and shared purpose who join a particular community, it was then essential to find students belonging to the same community. For this purpose, we asked the administration of YADIM to be provided with such a community of learners. As a result, we were assigned with a class of neophytes, homogeneous in nature, that is, all prospective members of DECOBA and established a classroom-based *replica community* to implement the enculturation process.

It was obvious that a period of induction and orientation was needed to initiate the neophytes into the membership of their faculty parallel to the programme of YADIM, enculturating them so that they could operate efficiently in accessing the knowledge of the target domain through written genres of economics and business texts. The conceptual framework of the enculturation model which is illustrated on the next page is conceived in order to initiate the knowledge acquisition process.

The model highlights the integrated and the reciprocal nature of the enculturation process, that is, YADIM and the target community are considered as an integral part of the whole enculturation process with the faculty visits forming a kind of bridge between the two contexts. The shaded area in the model illustrates the resulting adaptation and enculturation.

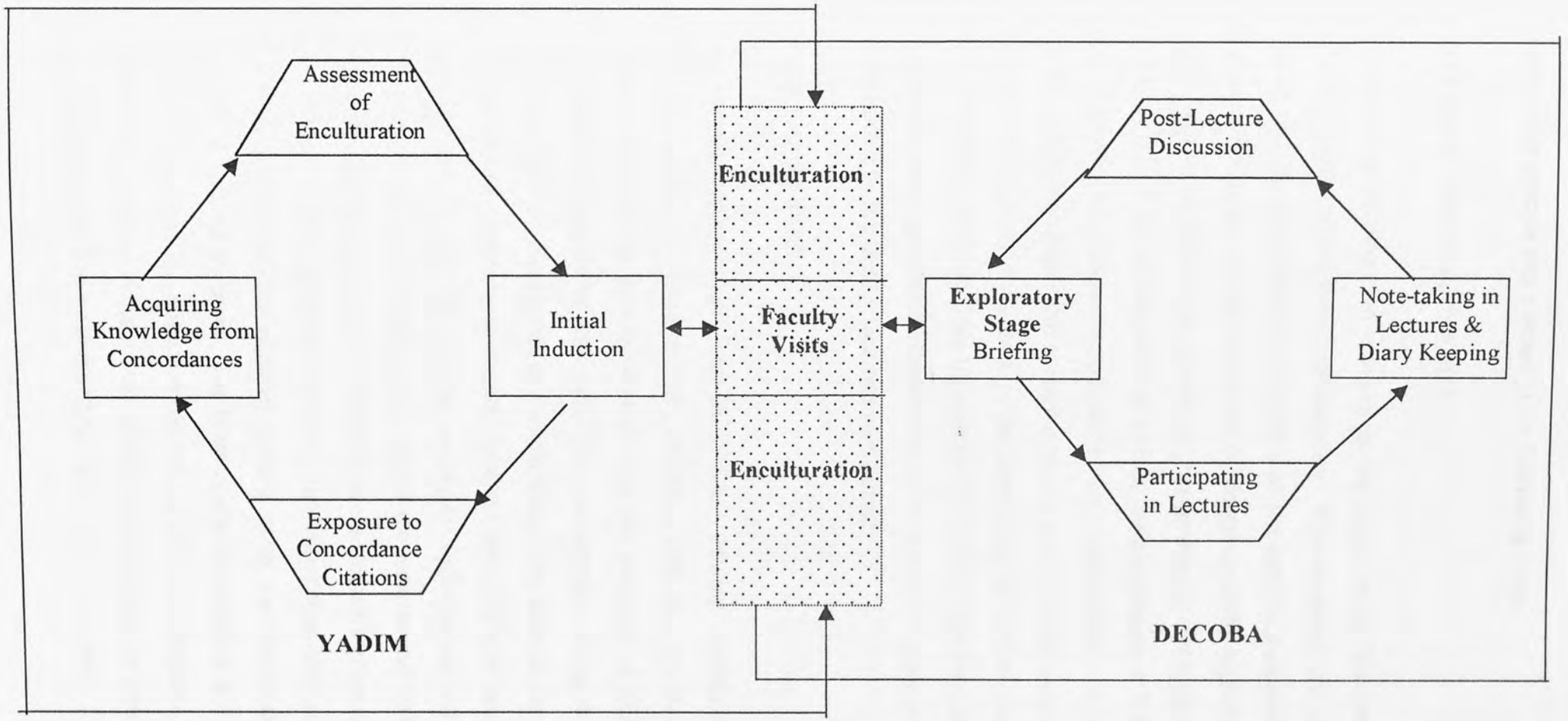


Figure 5.2 The Conceptual Framework of the Enculturation Model

The enculturation process was planned in the following stages:

5.8.1 The Initial Induction at YADIM

The first part of the enculturation involved giving neophytes or "the new initiates" (Rosch & Reich, 1996) a *sense of community membership*. The classroom and the whole atmosphere under which this group of neophytes experienced the enculturation process was treated as a *replica community*, under which acquisition of domain-specific knowledge via L2 could be facilitated. In order to increase the neophytes' perceptions of this particular context, the goal and the framework of the enculturation as well as the programme at YADIM were described and their responsibilities as *active members* were highlighted. It was emphasised that although the neophytes' short-term objective was to pass YADIM's exemption test, the long-term objective was to help them acquire the knowledge of written economics genres; help them have a smooth transition from the culture of YADIM into the culture of the TDC. A further objective was to give them a *community spirit*, a sense of purpose and direction, which was also requested by the faculty lecturers (see Chapter 1).

5.8.2 Exploring the TDC

This was the exploratory stage into DECOBA. Having established a community of neophytes, the next stage involved critically exploring with them the notion of the TDC. This exploration was carried out in collaboration with the members of DECOBA in the target setting. Thus, the first encounter with DECOBA was arranged during the second week of the Academic Year 1994-95. Neophytes, as a whole class, were taken to the target context, where they were introduced to faculty members, lecturers and first year undergraduates or non-enculturated learners, in order "to raise the neophytes' sociocultural and textual awareness in academic contexts" (Rosch & Reich, ibid.). Since the lectures and textbooks are important modes of communication in academic classes the neophytes were given a briefing, the content of which included various aspects concerning the target academic culture, including the amount of reading involved, the required passing grade and the range of academic tasks expected to be carried out by them. The briefing was followed by a questioning session in which neophytes raised various questions concerning their preconceptions of the TDC. At the end of the briefing, a cocktail party was given by the faculty to promote communication between neophytes and the first year undergraduates and the lecturers.

This was the first formal academic cultural learning stage and at the end of this induction session newcomers formulated a set of individual perceptions regarding the reality in which they were expected to function and they became acquainted with the practices and expectations of their faculty which they were to join. With this initial step the formal enculturation process had started in initiating neophytes into the academic discourse community. Though the enculturation practices carried out at YADIM formed the basis of neophytes' entry into their target community, the briefing created an opportunity in which the culture is shaped by the interaction of newcomers and those of the "culture bearers" (Corcoran & Clark, 1984), i.e. the lecturers.

5.8.3 Introducing Concordance Citations

The enculturation process was initiated to enable the gradual absorption of the target culture. Therefore, the next stage involved "further preparation for enculturation" by exposing neophytes to concordance citations of key words with their significant collocates and letting them discuss among groups of three to promote a collaborative knowledge acquisition process. Neophytes were presented with multiple examples of the key words in co-text and they were encouraged to examine these on-line concordances to discover how concepts gain meaning in co-text. They were asked to read the concordance lines to see what light is shed on the concept underlining the key word by each of the citations and in this way to achieve a narrowing down of the concept in their specific domain. They were then asked to exchange this information with their peers in order to enrich their perceptions and articulate the reasons for their inferences, which they could do mainly in L1.

By integrating corpus data into our research, neophytes were encouraged to develop strategies to derive information from the data about a lexical item they did not recognise or they recognised as part of their general knowledge of English but which takes on a specialised meaning when collocated with other lexical items. Before giving the students concordance-based pedagogic tasks for the first time, a brief introductory session was conducted in which it was explained to them what a concordance is, they were allowed to see the concordance programme in action. Moreover, they were informed that the corpus was made up of the authentic texts of economics and business studies, they will be studying in their TDC. The research was conducted as an integral part of the reading/writing component of the programme at YADIM, with 6 hours of weekly teaching and lasted 30 weeks altogether.

5.8.4 Participating in the Lectures

As stated in Chapter 3, one way of approaching the notion of genre is from the view of verbal communication that should be studied in their "authentic environment of an utterance, the environment in which it lives and takes shape" (Bakhtin, 1981:272) and as such, they should be studied in their actual social context of use which can be fully understood and appreciated only by observing "insiders" (Johns, 1990). Thus, to give neophytes opportunities to observe the insiders', that is, the lecturers, weekly visits were paid to DECOBA in which neophytes acted as "participant observers" as one way in which they could "acquire genre knowledge as they participated in their profession's knowledge-producing activities" (Berkenkotter & Huckin, 1993:477).

Neophytes, as a whole class, started to visit lectures given to the first year undergraduate students at DECOBA through L2, after obtaining the written permission of the administration of both YADIM and the Dean of the Faculty. The objective of lecture participation was to make neophytes see the relevance of the enculturation studies carried out at YADIM to their future academic studies and give them a real opportunity to evaluate the knowledge they had acquired throughout the enculturation period at YADIM in comprehending the lectures presented in their faculties. These visits also allowed neophytes to extend their contacts with the members of the faculty and to access both lecturers and the first year undergraduates as "informants" (Selinker, 1979).

In Section 4.1.4, it was assumed by researchers working in the L2 learning situation (Schumann, 1976; Gee, 1990; Rogoff, 1990; Woods, 1992) that interaction between the new students of any particular field and the members of the target group would accelerate acquisition. Similarly, it can be argued that faculty visits in the form of participating in the lectures formed a kind of bridge between the enculturation practices of YADIM and those of the TDC, leading towards a smooth transition into the target context.

While in the lecture, each neophyte was required to take notes about the lecture content. Each lecture participation was followed by a post-lecture discussion session held in L2, in a classroom which was allocated by the faculty. During the post-lecture discussion, the neophytes were asked to revise their notes and reflect on their understanding of the content of the lecture, which had the purpose of generating a classroom discussion based on the lecture

attended. In addition, we also participated in the lectures with the neophytes and took notes, which we used in the post-lecture discussion.

The lecture participation went parallel to the knowledge acquisition practices at the language centre, in other words, an average of two visits were paid to the faculty each week besides the enculturation studies at YADIM. At the end of the academic year, neophytes as a whole class participated in a total of 50 hours of lectures which were given by three lecturers.

5.9 Methodology for Determining Knowledge Acquisition

In Chapter 3/Section 3.8.1 of the thesis a distinction was made between the two dimensions to learning as *process* and *product,* in which the former is dynamic while the latter refers to the outcome of learning and is static in nature. In the present research although the major concern has been investigating the process dimension to acquisition through the TAPs, the product dimension is also investigated through the written recall protocols. In addition, other sources of data include questionnaires, diaries and examinations utilised as supplementary data collection devices, each of which will be elaborated in the following section.

5.9.1 Think Aloud Protocols (TAPs)

TAPs were utilised to offer an answer to the second research question (see Section 5.3 of the present chapter), to help us analyse the cognitive processes of neopyhtes *in vivo*, as they were happening, during the acquisition period. This method involved having learners verbalise their thinking, record it, transcribe it and the subsequent analysis.

In translation studies, House (1988) observed that TAPs in pairs yield richer and more insightful data than think aloud protocols based on one person only, because dialogue protocols contain a large amount of descriptive talk accompanying the action. In dialogue protocols solutions in the area of translation are negotiated and thoughts are consistently shaped through the necessity to verbalise them. House (1988) and Kussmaul (1995) agree that working with more than one person involved, has a large pedagogic potential and "teaching translation in and as interaction might be preferable to the still overwhelmingly popular practice of asking students to translate in splendid isolation" (House, 1988:96). In the present study group protocol is adopted due to the practicality, convenience and advantages it

offers. The framework of this method is shown by the following figure. In the figure, each group of neophytes consists of three students and is demonstrated as TAP.

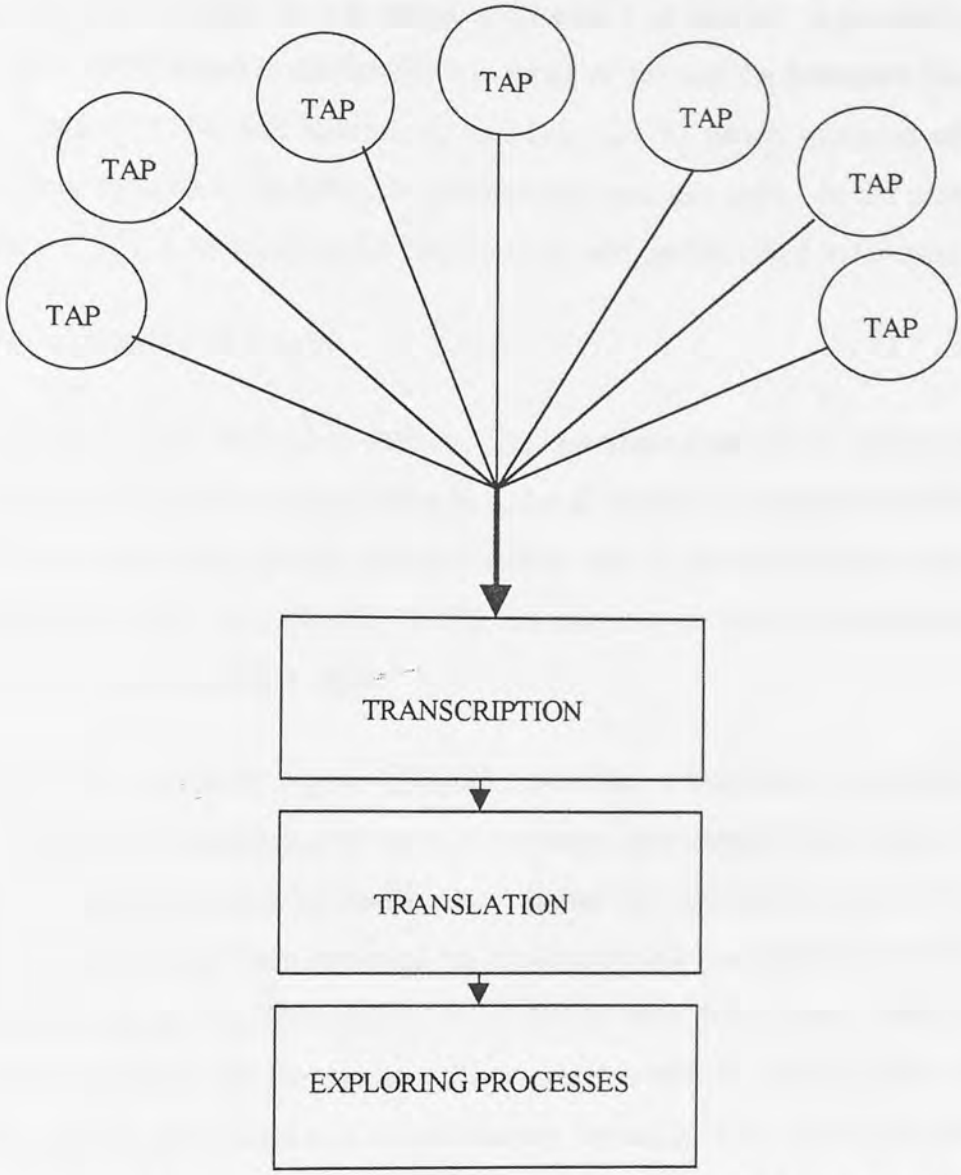


Figure 5.3 A Framework for Obtaining Data Through the TAPs.

In addition to investigating the processes occurring in knowledge acquisition, the product of what has been acquired has also been investigated by means of written recall protocols.

5.9.2 Written Recall Protocols (WRPs)

As stated in Chapter 3, a literature review helped us discover that text recall protocol is one of the most appropriate methods for investigating the product of what has been acquired as it provides a more sensitive measurement device. The rationale for incorporating WRPs into our inquiry was to gain deeper insights into the mental representation of knowledge as a result of the conceptual processes involved in the acquisition of domain-specific knowledge, thus

determine the product of what kind of knowledge has been acquired. Our second aim was to monitor the impact of the enculturation study and compare the research findings with those of the non-enculturated learners. It was stated in Chapter 3 in relation to protocol analysis that among the approaches found in the literature in terms of scoring the protocols was the method offered by Kintsch (1974) and Kintsch & van Dijk (1978) which involved carrying out a macro and micro analysis by dividing the recalled text into idea units. In the present research, analysis of the WRPs is based upon the idea units, as will be described in Chapter 6.

5.9.3 Questionnaires and Diaries

In the preliminary data collection section, the questionnaires were administrated to the lecturers and the first year undergraduates in order to identify problems and difficulties. At the end of the enculturation period, a questionnaire was given in the form of an evaluation form, (see Appendix XII) this time for a different purpose, in order to obtain the neophytes' perception of the enculturation studies.

In addition to the afore-mentioned methods, personal reflections and affective side of knowledge acquisition concerning the new experiences encountered was obtained by eliciting neophyes' responses by means of diaries, kept during the enculturation as well as the post-enculturation stages, which also provided information about the processes *in retrospect,* and had an evaluative aspect. In other studies where diaries were used (Long, 1980; Nunan, 1980, among others) diaries did not accompany other research methods, such as TAPs. Our study is unique in that diaires were used as a supplementary device to TAPs thus providing data from multiple perspectives in tracing the cognitive processes involved in knowledge acquisition. Diary analysis is discussed in Chapter 7.

5.9.4 Examinations

Three examinations which were administered by the lecturers as part of the course requirement to the first year undergraduate students at DECOBA constitute the final research method utilised in the present study. Like the written recall protocols mentioned above, the data from the examinations was obtained by monitoring neophytes' performance through a controlled follow-up study, following their completion of YADIM, which is intended to provide information on the extent to which enculturation contributed to their academic studies at DECOBA. The students included were all enculturated learners in our research as well as

their first year counterparts who had completed YADIM without experiencing any enculturation.

5.10 Summary

This chapter has been mainly concerned with designing the methodology of our study which has been developed in the light of the theoretical framework described in the last two chapters. It has been stated that a two-stage research model was developed in order to enculturate prospective members of one academic community. Prior to initiating the actual research, a preliminary investigation was conducted by means of interviews and questionnaires in order to understand the problems experienced by the members of the TDC from their own perspective. Questionnaires have been utilised in order to counterbalance the possible subjective value interviews might have and to obtain objective data. In the establishment of spec. corpus, a description of the stages involved in creating the corpus of written genre of economics and business texts and journal articles has been given. It has been stated that computerised corpora provide us with direct access to the written genres and helped identify more systematically and objectively lexical realisations of concepts and areas of a shared frame of reference which the new members to the community need to be familiarised with. Accepting that these concepts are the prospective members' major requirement, they were presented to them during the process of enculturation, to enable knowledge acquisition process, which is subsequently hoped to enable neophytes in accessing the written genre of economics and business texts in the WER situation in their TDC.

The first stage of our research aimed to initiate the enculturation process taking place partly at YADIM and partly at DECOBA. Subsequently, TAPs were used in order to trace the processes taking place in acquiring knowledge. The overall evaluation of the enculturation studies was carried out by an evaluation form and analysing diaries in which the neophytes reflected their personal points of view about the new experiences encountered. The final stage of the research was called post-enculturation in which neophytes were monitored at DECOBA, through the written recall protocols, examinations and collecting further diaries. Employing a variety of data collection methods enabled us to approach the research from multiple perspectives.

The next chapter of the thesis is devoted to presenting and analysing the data collected from the data collection tools mentioned above, while implementing our research.

CHAPTER VI

PRESENTATION and ANALYSIS OF THE DATA

6.0 Introduction

Chapter 5 dealt with the methodology of the study. This chapter deals with the presentation and analysis of the data obtained from both during the enculturation and post-enculturation stages of our research. First, the data obtained from TAPs which constitute the basis for the analysis of the processes of knowledge acquisition will be presented. The next source of data we will present include WRPs which aim to investigate the product of knowledge acquisition. This will be followed with the data obtained from evaluation forms, diaries and the examinations.

6.1 Analysing The Process of Knowledge Acquisition - A Dynamic View

This section aims to trace processes taking place in knowledge acquisition of neophytes, from the very initial to the very final stage of development, by observing how input of knowledge *seeds* grow from a *dynamic* perspective. It also describes how *input* has been converted into *uptake* by the collaborative effort of neophytes in their joint attempt to construct and acquire domain-specific knowledge. (See Chapter 3 for a discussion of these two concepts).

6.1.1 Framework for Observing Developments in Knowledge Acquisition

> Scientists are students -students of nature, to be sure, but, like all students, dependent for their success on the taking of notes. In even the most routine of scientific research, scientists must preserve external records of their work. Most externalise far more than just data, making records of their hypotheses, readings of the literature, wild speculations and the like. Thus, scientific diaries, laboratory notebooks, indeed the entire range of recording techniques, constitute an important topic for a full understanding of just what scientists do.
>
> (Holmes, 1987 quoted in Tweney, 1991:301).

Although not scientists yet, our neophytes are hopefully on the way to becoming future scientists, economists and businessmen of the nation. For this purpose, a methodological framework has been developed, illustrated in Figure 6.1 on the next page, in the light of the theoretical discussion in connection with task-based reasoning in order to trace cognitive

processes from the very initial knowledge level via the initial uptake, to the very final level and determine the increments in the acquisition process[3].

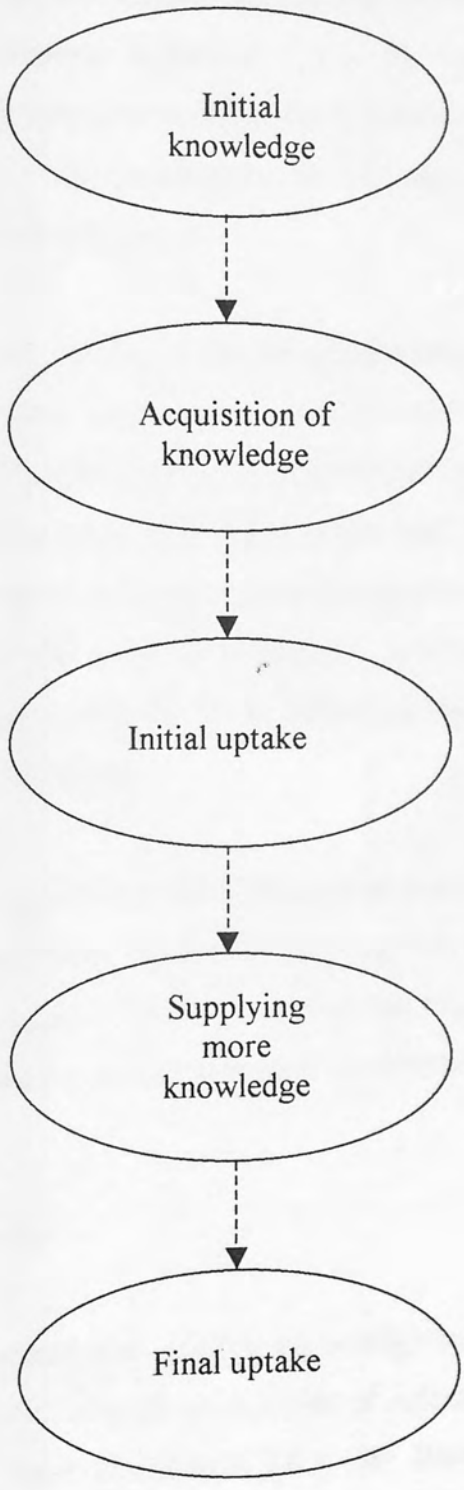


Figure 6.1 A Framework for Observing Developments in Knowledge Acquisition

[3] Figure 6.1 is only relevant for tracing the processes to be discussed in this section

In Section 3.8.1 the task-based reasoning was discussed and it was stated that acquisition of domain-specific knowledge could be planned around particular tasks. Our methodological framework is based on this theoretical principle with some extensions made to it, in order to be consistent with our research objectives. It is developed around the five components, namely, *initial knowledge, acquisition of knowledge, initial uptake, supplying more knowledge and final uptake*, which in fact correspond to sub-tasks in Nunan's terms (1991) for the purpose of analysing such developments.

It seems important to point out that in the framework above, initial knowledge, initial uptake and the final uptake are *static* as they stand and they refer to quantitative aspects, measurable quantities of knowledge, but acquisition of knowledge refers to the *dynamic* aspect and is a process, whereas supplying more knowledge refers both to the process and methodological procedure. In order to examine the processes taking place during knowledge acquisition we looked at the product which refers to neophytes' written initial and final uptake. We also analysed their discussions during the TAPs, reflecting the dynamic aspect, to trace processes involved in knowledge acquisition.

Such a framework was devised in order to be able to analyse the actual processes taking place in the acquisition of knowledge. Moreover, learning was described in Section 3.3 by Norman (1980:50) as "filling in a gap". To find out what the gap is in one's knowledge base so that the actual processes leading to acquisition could be identified. Each of the components will be elaborated below:

6.1.1.1 Initial Knowledge

This component shows neophytes' existing knowledge base or initial schema which is used as a *reference source, source domain* or *a frame of reference* by them during the acquisition process. It has been stated in Section 3.4.4 that learning cannot be determined without identifying existing knowledge structures. In order to ascertain neophytes' existing knowledge of a particular concept and determine how much of the prior knowledge was made use of, before each group started their debate, they were asked to write down what they already knew about the related concept, alternatively answer a particular question related to

the concept they were about to discuss. Thus, the neophytes' existing knowledge base has been taken into account in order to identify conceptual growth, as in a similar kind of study done by Mason (1994) with biology students and Carey (1985) with science students.

To differentiate between different levels of knowledge displayed by neophytes during the initial knowledge component, we identified the following different scales of uptakes on the basis of the data analysis:

No initial knowledge: Displaying no knowledge (see some debates on *substitutes* in this chapter)

Some initial knowledge: Displaying some elements of knowledge, whether general, everyday knowledge or knowledge related to economics (see the debate on *domestic goods* and *inferior goods*).

Full initial knowledge: The degree of knowledge displayed being almost equal to the input to be offered for acquisition (see the last debate on *broker*).

In Section 1.2 of our research, concept formation was likened to the growth and development of a plant and it was stated that plants grow *microscopically* and *macroscopically* and that they need seeds to grow. Similarly, the seeds of knowledge needed for the development of concepts have been provided through identifying the key words, on the basis of the spec.corpus, as described in Section 5.6. These seeds represent important economics concepts and one concept was introduced at a time, with the aim of supplying *the input* for the acquisition of domain-specific knowledge. The sequence in which the concepts were introduced to neophytes was explained in the methodology chapter. Thus, we followed the following steps in setting up each task which enabled us to *observe* the seeds grow.

6.1.1.2 Acquisition of Knowledge

This component reflects the operations of cognitive and interactional reasoning strategies, in collaboration with the interlocutors in the constructivist environment to knowledge acquisition (see Section 6.5 for a detailed analysis of strategies). As stated in Chapter 5 on Methodology, group protocol was adopted due to the practicality, convenience and advantages it offers, in which each group consisted of three neophytes who were asked to verbalise everything that

went on in their minds while performing the task of focusing on the concordances (see Appendix III for some concordance lines).

The discussions which were carried out in L1 with some code-switchings into L2 were recorded on tape and were transcribed and then translated into English. The decision to have the debates recorded in L1, as the medium of discussion, was taken deliberately so that the learners would express more clearly what they had comprehended from the input given as effectively as possible. As Langer et al., (1990:429) note "when students use their native language to talk or write about what they have read in English, more text understanding is displayed than when those same activities are conducted in English". Lee (1986) confirmed Langer et al.'s view, yet, he posed the question that using L1 during a particular task might run the risk of becoming a very rich source of knowledge and further claimed that SLA and reading comprehension do not necessarily go hand in hand. To judge the validity of this claim in relation to knowledge acquisition, we balanced Turkish debates with having neophytes write what they had acquired in L2.

The discussions were then subjected to analysis to obtain descriptions of what kind of cognitive processes were taking place during the acquisition of domain-specific knowledge. The time of discussion was not limited; each group was allowed to continue their discussion until they felt satisfied. As for the organisation of each group, a random selection was made of neophytes in working together so that they could have equal ability in expressing themselves and none of them taking the leading role either due to better capabilities or personality features. A total of seven groups, each consisting of three students, were involved in this part of the research.

6.1.1.3 Initial Uptake

As a follow-up to each debate, we wanted to determine *uptake* - the outcome of learning and the quantity of knowledge the individual learners reported to have learned - in order to determine whether negotiation of meaning did result in comprehension or not by collecting written reports from the neophytes. Hence, each group of neophytes reported in writing in L2 what they had learned from their discussion. Our second aim was to decide on the extent to

which the input from the concordance lines had contributed to the learners' acquisition of knowledge. In order to assess what neophytes had acquired as a result of communicating, they were asked to answer the same question as the one asked at the initial knowledge component in L2. This component of reporting what was acquired corresponds to the *goal* component in Nunan's description of a pedagogic task.

6.1.1.4 Supplying More Knowledge

The purpose of each task for neophytes was to reach the *shared level of understanding* with members of the TDC about each concept. Following the previous component, neophytes were supplied with more information by providing them with a real text related to the concept they debated when they did not reach a shared level of understanding, by comparing their own understanding of the concept with the way the same concept is defined by the members of the TDC, information for which was obtained from the economics textbooks utilised by the first year undergraduates. This served another purpose; to instantiate further slots in their conceptual structure, thereby helping us become aware of the developmental processes in concept formation. Yet, in cases when the neophytes had reached a reasonable degree of understanding of the concept, there was no need to provide them with further information. This component was therefore optional.

6.1.1.5 Final Uptake

This was the last *sub-task*, the neophytes were asked to perform in the acquisition continuum, in which they were asked to compare their initial understanding of a given concept with the one they had acquired after reading the text and point out if there were any inconsistencies and/or mismatches. This component also served the purpose of assessing the increments of learning, that is, whether knowledge was internalised, whether assimilation of knowledge was taking place or not.

Therefore, in order to unravel the cognitive processes underlying acquisition and that of conceptual growth, as summarised above, the data was obtained through introspective procedures, namely, verbalisation of neophytes' thinking is an introspective method in nature,

and this was immediately complemented with a retrospective session in which they were requested to record what they had learned in L2.

Before presenting the data analysis, we provide the transcription conventions utilised for this study. Richards (1996:105) points out that "the nature of analysis will depend on what purpose it is intended to serve, although in all cases immersion in the transcript is essential; only then will patterns and sequences emerge". Atkinson & Heritage (1984:5) state that "it is sequences and turns within sequences, rather than isolated sentences or utterances, that have become the primary units of analysis". Similarly, when analysing, each turn in the discussion has been given a functional label, such as hypothesis formation or testing, as will be described in the following section and nothing that occurs in interaction has been ruled out *a priori,* as random, insignificant, or irrelevant.

Transcription conventions and abbreviations: A standard form of transcription is used here. The degree of delicacy developed and used by some researchers, (e.g. Jefferson, 1984) in transcription, has not been found necessary. As stated by Ochs (1979:44), transcriptions should contain no more detail than is necessary for the purposes of analysis. In the analysis, the following basic transcription conventions were utilised.

:	**extended sound**
// //	**overlapping speech**
(.)	**a long pause**
?	**asking a question**
g	**italic indicates emphasis**
,	**falling intonation (yeah that's it.)**

The following table illustrates the type of strategies identified, the abbreviation used to denote each strategy, provides a brief explanation appropriate for our research and gives a sample for each type. In Chapter 3.9.1 of the thesis, cognitive, metacognitive and interactive strategies were discussed. In our list of strategies, some labels from those identifed by other researchers are utilised.

STRATEGY	EXPLANATION	SAMPLE
Analogical reasoning/**Analog.**	forming an analogy between the source and the target domain	we keep pets at home so domestic economy is the economy of a nation
Inferencing/**Infer.**	reasoning to fill in the knowledge gap	an inferior good is a low quality good
Evaluation/**Eval.**	evaluating the value of analogy, etc.	yes, domestic economy is the economy of a nation
Generalisation/ **Genel.**	Based on knowledge gained from debate making a generalisation	if a good is used instead of another good, then that is a substitute good
Relevance strategy /**Relev.**	Questioning the relevance of the previous speaker's comment for the context	What does a substitute teacher have to do here?
Hypothesis form. & testing **Hypoform./ Hypotest.**	forming a hypothesis and putting it to test	could an inferior good be a poor quality good.. let's try and see
Elaboration/**Elab.**	providing extra information	government has a monetary policy and this policy is used to regulate the money system
Comprehension question/**CompQ.**	Asking for the meaning of a word	What's the meaning of scarce?
Reply /**Rep.**	answering the previous speaker's question	Domestic goods are the goods we produce in our country
Confirmation/ **Confirm**.	accepting previous speakers comments or ideas	Yes, you're right, a monopoly is a single firm
Reject/**Rej.**	rejecting the previous speakers comments or ideas	I totally disagree with you government has two policies not three.
Complement **Complem**.	completing and adding more explanations to what previous speaker has said	You're right there's only one firm in monopoly and TEKEL is a monopoly
Self-repair **S-R.**	correcting one's mistake	nooo sorry it's to do with the fiscal policy not the monetary policy
Other-repair **O-R.**	correcting other's own mistake	no..that's import... export involves goods we sell abroad

Table 6.1 Illustration of Strategies

In the above table, the first 7 strategies correspond to cognitive reasoning strategies, and the remaining strategies are interactional strategies.

The following section illustrates excerpts from the TAPs. Before each illustration, concordance lines upon which each debate is based are given. In each of the excerpts, a columnar layout is used in which the left hand column shows the debate, while the right hand column is devoted to our brief comments, and the strategies employed by neophytes are indicated in abbreviated form and in an italic print. A detailed analysis of strategies will be given in Section 6.5. For the purpose of our analysis, each statement in the debate is given a functional label to determine the conceptual content of each category, as indicated on the right hand column. Following each debate, a more elaborate comment is provided. Each student's name is retained without an exchange and in the debate transcript only the initials are provided. As the debates are held in Turkish, code-switching into L2 are demonstrated by bold print to differentiate them from the concordance lines read out in English, which are underlined. Although the TAPs were held in L1, as stated earlier, initial knowledge, initial and final uptake components were produced in L2 and neophytes' actual wordings were reproduced, only spelling mistakes were corrected.

A total of 250 debates were recorded. Of these, 26 could not be included within the scope of the present research due to the inaudibility or of the poor quality of the recorded material. The remaining 214 debates were analysed from both qualitative and quantitative dimensions. The following divisions are based on the analysis of those 214 concordance debates that took place throughout the academic year 1994-95.

6.2 Qualitative Differences in Knowledge Acquisition at Various Stages

On the basis of such an analysis, three chronological developmental stages were determined, namely, the initial or elementary stage, intermediate stage and advanced stage in knowledge acquisition. Of the 214 debates, 14 took place at the *elementary*, 85 at the *intermediate* and the remaining 115 at *advanced* stages. In fact, these stages were not predetermined, they were differentiated as a result of analysing the TAPs. The following section is devoted to describing these stages. The main differentiating criterion used for these stages will be described in the related sections below.

6.2.1 Initial or Elementary Stage in Knowledge Acquisition

From the analysis of the TAPs, it was clear that this stage was mainly a stage of getting to grips with the concordance lines in which the neophytes mainly focused on the immediate environment of the key word. They only picked on the compound ideas such as "economic goods" or "household goods" and did not make full use of the context available to them in the environment of the key word, as they did in the next stages.

Economics was the first word debated, which was followed with *household* with related significant collocates. A total of 14 debates were recorded during this stage and the uptake acquired by neophytes was also fairly brief as will be illustrated below following the debate. Some knowledge was acquired but it was limited, and mainly based on trying to make sense of word(s). This stage lasted for three weeks [4].

Household goods, as one collocate of *household* is defined by members of the TDC as:

goods and services which are produced for the benefit of a household

Excerpt 1: *Household*

personal disposable income is **household** income after direct taxes
or a fall in **household** incomes, would change the
directly or indirectly to **household** incomes. If the tyre
back to firms through **household** purchases of firms' output
rate of return on **household** savings is the relevant
and the value of **household** spendings on these goods
does not come from **household** goods it must come

Cenk, Tuğbay and Burcak discussing *household*

B: Uhmmm yes well..what is household first of let me see.. **household and income**	***CompQ***
C: household well I think it comes from the word house I mean it is probably related to house	***Reply* with reasoning**
T: I think so::: I mean it can't possibly be anything else let's look at this line where there is **household spendings** I think it must be the money people spend on whatever they buy	***Confirm***
B: there is also household goods what does goods mean I don't know **income income** that means money money but of course households save money for future	***Extend***

[4] The neophytes' level of English matched Level 2 at YADIM's programme at the beginning of our study, which corresponds to "lower intermediate level". By the end of the same academic year neophytes had moved up to the "upper-intermediate level".

The uptake of the above group: *The households have spendings. They spend money on what they buy. Households would have income and they also save money.*

As can be seen the amount of knowledge acquired was highly limited. The uptakes of the other groups did not show marked difference.

6.2.2 Analogical Reasoning at the Intermediate Stage in Knowledge Acquisition

A total of 85 debates out of the 214 debates were recorded and analysed during this stage, of which *scarce* with its related collocates was the first word debated. The main characteristics of this stage was that analogical reasoning was extensively employed by the neophytes and there was a good deal of negotiation involved amongst them in resolving the meaning of a particular word before reaching consensus on the shared frame of reference. There were many occurrence of *analogical reasoning, inferencing, evaluation, hypothesis formulation and testing, comprehension question, rejecting*, etc. as will be illustrated in the following section.

Excerpt 2: From *I scarcely do that* to *scarce goods*

The level of shared understanding reached by economists on the concept of scarcity is given below:

Scarcity is "a shortage and an important part of economics. Wants are virtually unlimited and resources are scarce therefore we are faced with the need to make choices" (Wonnacott & Wonnacott, 1986: 809).

hope of making wheat **scarce** and raising its price.
diamonds are naturally **scarce** (and the diamond suppliers
resources are limited or **scarce**. Because of these two
encourages consumers to use **scarce** goods carefully. For example,
In this case, the **scarce** goods go to those
In order to get **scarce** goods, they waste time
economy has plenty of **scarce** resources which can easily
encourages produces to conserve **scarce** resources. In the pasture

Hakan, Fatma and Ebru discussing *scarce goods*

H: Uhmmm yes I..It's like I **scarcely do that**.
F: diamonds are naturally scarce Could scarce mea::n **limited** or **shortage**
H: loo::k limited resources here it says that the natural resources are limited
F: in order aaa yes it means to do something

***Hakan accesses an *analog* from his source domain**
***Fatma formulates a *hypothesis* attending to "limited"/ mapping starts**
Hakan drawing attention to more of the linguistic features /*tests *hypothesis
***interruption with an unknown word**

H: **scarce goods** must be **limited goods**, such as wheat **diamond** and **gold** because they can't be found easily	***Hakan *evaluates analogy* and continues with *inferencing***
E: yes and also they're expensive uhm there is also this look human beings waste time getting scarce resources	***Ebru attends to more linguistic evidence**
F:Why?	****CompQ.***
E: I guess it is beca::use they are **expensive** and consumers should be encouraged to use them carefully	****Reply* with reasoning**
F: Okay then what is meant by scarce is...well natural resources are **limited I mean scarce** like diamond and they are more valuable compared with unlimited ones	***Mapping completed, a *generalisation* is made**
H: Certainly, **scarce goods** are found in limited amount in nature	****Confirm.***

In each debate, learners were helped to activate their existing knowledge related to a particular key word in terms of what that particular word would mean in general and what it would mean in relation to economics by directing some factual questions. For example, "what does scarcity mean to you?".

The initial knowledge base of the above group was in the area of linguistic knowledge, which cropped up in the debate once more. After the exposure to the concordance lines, Hakan accessed an analogue from his memory, a prior learned phrase, "I scarcely do that" from his "familiar frame" (Fillmore, 1985) linguistic knowledge (source domain) having perceived semantic similarity between a known concept and a target one which is more abstract than the familiar concept, as the starting point of learning something new. This formal similarity activates a frame that scarce could be described as a *rare phenomenon* and is discussed before reaching the uptake component by means of various reasoning processes among the group members. Fatma, the second interlocutor, takes up Hakan's output and combines it with what else she notices from the concordance lines relating it to *limited,* formulating a hypothesis and extending the meaning *I scarcely do that.*

The corresponding properties of *doing something scarcely* and that the goods being found scarce or limited in nature are matched. Hakan places linguistic similarity (scarcely) in the

source domain into correspondence with the target domain (economics) on a one-to-one isomorphism, aligned with limited or scarce, in the target domain, therefore establishing higher order relations, explained in connection with analogical reasoning in Section 3.9.2. He seems to be aware that *doing something scarcely* implies features of rare and seldom which are transferred into the target domain that scarce goods could be found in little or less amount in nature. The process of transfer seems consistent and systematic. Fatma evaluates and makes a generalisation on the target concept *scarce.* Eventually, Hakan extends Fatma's evaluation. It can be stated that Hakan's initial analogue has been helpful in building a bridge between the source and the target domains.

Types of uptakes: In the present study, the increments in the development of knowledge in learners at the uptake component was ranked at three levels along a progression of conceptual understanding. The following three categories of uptake which demonstrate whether the actual acquisition has taken place or not, are based on the analyses of debates. These are *full uptake, partial uptake* and *no uptake* and one example for each category is provided. The criteria for our decision are based on comparing the amount of knowledge acquired by the neophytes and then checking it against the level of shared understanding reached by the members of the TDC for that particular concept. We identified the following three different scales of uptake based on the data analysis.

Full uptake: When there was a greater degree of overlap or approximation between the perceptions of the TDC members and neophytes in relation to a particular concept.
Partial uptake: If there was a partial approximation.
No uptake: If no approximation between the two existed.

On the basis of the amount of information provided by the concordance lines, it can be concluded that for this particular discussion (see the TAP above) all groups ended up with *full uptake*. The following statements are written down in L2, by the above group after the discussion was over.

From some initial knowledge base to full uptake: *"If something is scarce there is not much of it. Scarce goods are the goods that exist not so much in the world. Some of these are wheat, diamond and gold. Human beings waste time in order to get scarce resources".*

This shows that initial slots in the learners' schemata were filled by a process of "accretion" (Rumelhart & Norman, 1978). See Section 3.5.1 for details.

When the uptake of the above group is compared with the shared level of understanding reached by the TDC members of the same concept, which is provided in the box preceding the concordance lines above, it can be seen that it is more than a simple definition of the concept. At this point in the discussion, it would be worth clarifying what we mean by a definition. As stated in relation to the mental representation of knowledge, particularly in connection with schema theory, knowledge is represented in a hierarchical structure forming a kind of network. We take the definition from Carley (1986:396) as "a focused network of facts such that the focus is the concept being defined and the other concepts in the network serve to define the focus of their relationships to it and to each other".

Although this particular group ended up with full uptake, they were provided with a larger context of information on scarcity against which to evaluate their understanding. The final uptake of the same group is as follows:

Final uptake of the same group with not much difference between initial and final uptake:
"If human beings did not want more than they actually needed there would not be a scarcity problem. But human wants are infinite, because of this the resources available in the world are not enough to meet their needs. In the world, resources are becoming less but human beings do not realise this. We must not forget that world resources are limited but human wants are unlimited".

As is clear from the final uptake, there was some expansion in the amount of knowledge added to the initial uptake, which has been produced by the neophytes after having been exposed to the domain-specific text on the same concept of scarce, the result of the "tuning process" (Rumelhart & Norman, 1978). See Section 3.5.2 for details on the tuning process.

For some group members, however, the initial knowledge remained "inert" (Prawatt, 1989) or "tacit" (Polanyi, 1966). It was only after exposure to input and through the collaborative effort of group members that acquisition was made possible. Yet, the initial and the final uptake of the other groups did not show marked difference, in this particular case, as illustrated in Appendix IV.

Various clues assisted neophytes in assigning default values, filling in slots in the schema and finding a "mental home" (Anderson & Pearson, 1988). These include *limited, diamonds, conserve scarce goods, expensive* and *try to conserve*, all of which provided information as to what the concept of scarcity could mean in economics. (See Chapter 7/Section 7.3.1 for advantages of concordance lines).

Excerpt 3: From *domestic animals* to *domestic economy*

The next key word debated was *domestic* with its related collocates. When neophytes were asked to record their existing knowledge concerning *domestic* and what domestic might mean in economics like *domestic goods* and *domestic company*, most groups stated that "if some animals are domestic we call them pets". This shows that they recalled domestic animals, which they heard at school in their English lessons and their existing knowledge was in the sense of the animal frame with *pet* being an element in it. One of the group members stated that "domestic reminds us of the things people feel near to them, something which is related to home and someone who likes home life. The other meaning belongs to animals. If some animals are domestic we call them pets". This shows *a home frame* and that there are further gaps in the knowledge base that need to be filled in.

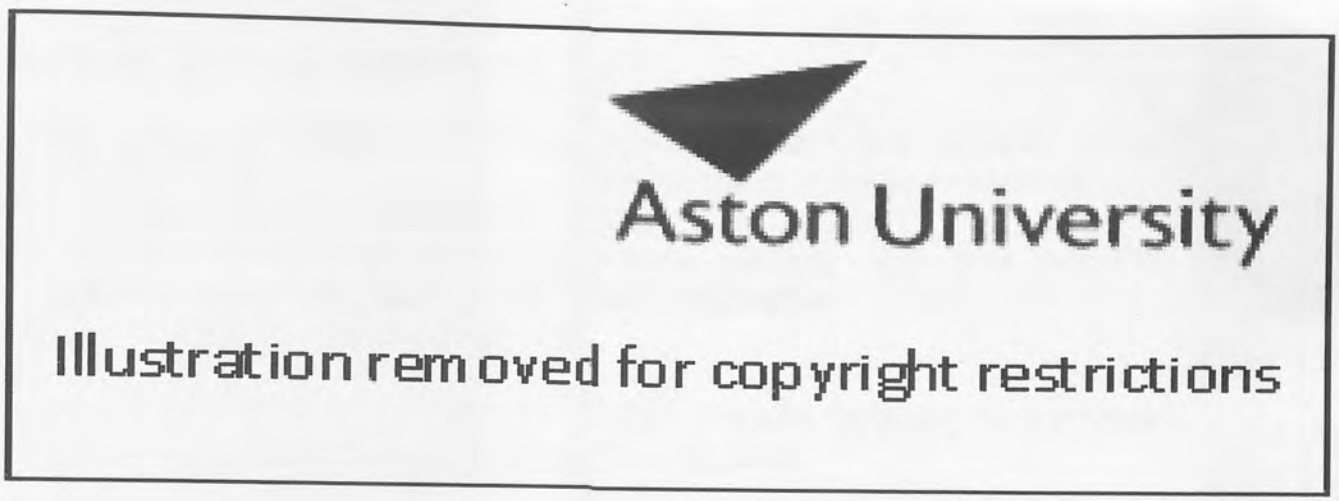
The following debate illustrates how all levels of available initial knowledge of the above group cropped up and were tried out as possible hypotheses in the debate, which also illustrates the gradual process of transfer of knowledge from the source domain onto the target domain in which input is converted into uptake by various cognitive analogical reasoning processes.

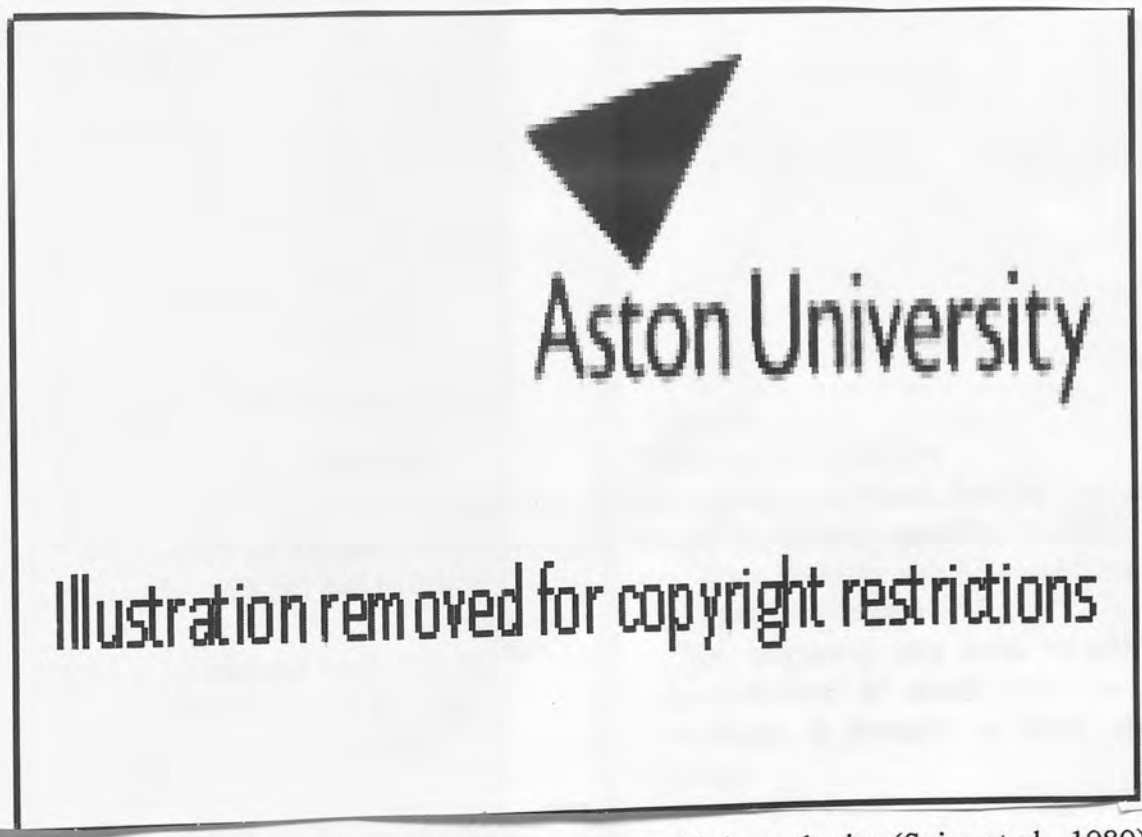
Price is one collocate of *domestic* and domestic price to an economist is defined as:

"Domestic price is the price of good or service within a country". (Wonnacot & Wonnacott, 1986).

total income produced by **domestic** citizens regardless of the
several laws that encourages **domestic** companies to do business
the marginal benefit to **domestic** consumers.
expensive oil imports. Hence **domestic** consumption per person has
domestic money wages. the **domestic** economy has adjusted to
Suppose also that **domestic** firms absorb the increase

is a lot of **domestic** inflation, which the government
no increase in either **domestic** prices or domestic money
reduces consumption but increases **domestic** production. Hence imports fall
it still takes more **domestic** exports, made possible by





The above debate is a good example of generating multiple analogies (Spiro et al., 1989), that is, two analogies are mapped onto one target concept. In fact, the initial frame evoked was the animals frame, what Minsky (1975) refers to as the "familiar frame", the source analogue

which is used as a source of reference. However, the relevance and aptness of the analogy (animal pets) is questioned. In fact, neophytes had learned *domestic* in their classes at school as referring to home, and as one special collocation they learned *domestic animal*, for which they learned as a synonym the word *pet*. The reasoning and mapping they are doing in the debate is obviously based on what they know about *home* in the more concrete sense, which is largely knowledge acquired in their daily lives in a Turkish context. Ebru's attentiveness to the collocates of domestic, such as citizens, companies, economy, firms, etc. initiates the mapping process, which is in the nature of one-to-one correspondence; each element in the source domain corresponding to each collocate of domestic like people, firms, consumers, all taking place within the boundaries of one's nation, Turkey, the target domain, as illustrated by the following framework.

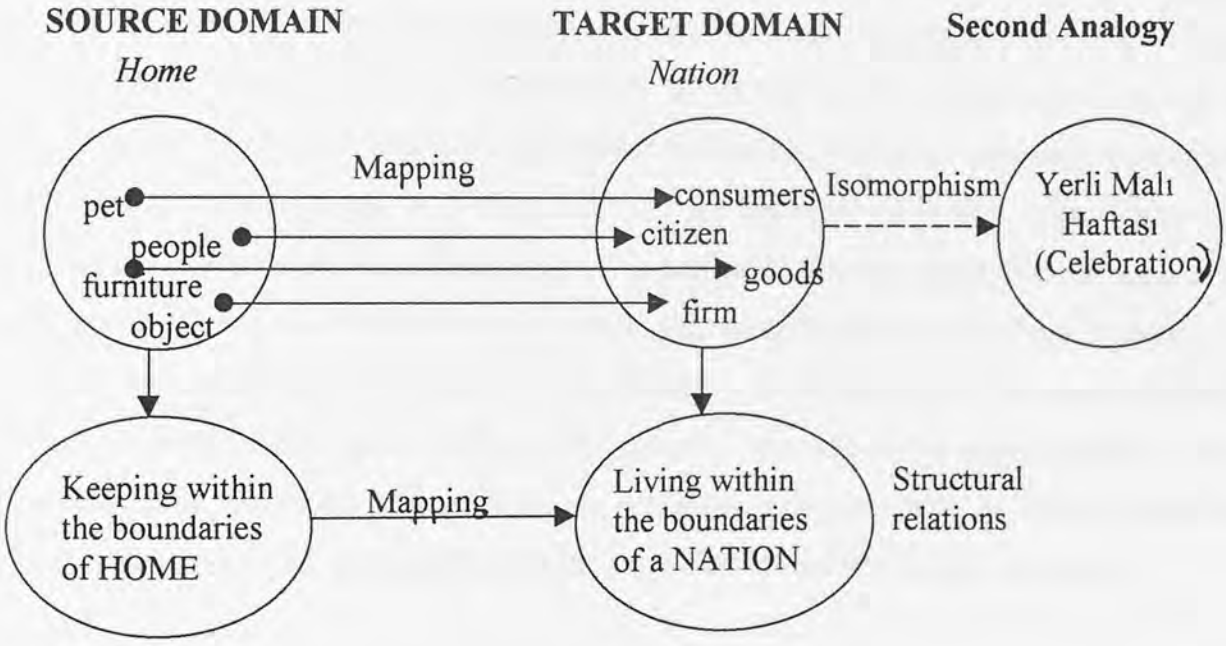


Figure 6.2 A Schematic Representation of "Domestic Pets Analogy"

Ebru establishes the underlying structural relation, that is, keeping animals at home as domestic animals is corresponded and analogued to the sense of being within the home, within one's country, which is the main analogue. Mapping, indicated by the arrows, is used to transfer corresponding information from the source domain, a concrete situation, to another more abstract target situation. In the *keeping animals at home* analogy, home serves as the source domain and pet is one element within this domain. Other elements would be people

living in the home, objects used, etc. The analogy rests on high-level relations (Gentner, 1983). As stated in Section 3.9.2.2 in the analogical mapping process, attributes or properties of the analogues are not transferred at all, only the underlying structural relations, that is, the higher order relations between the elements in the source and target domains. Thus, being inside a home, that is, a container, is a relation and it yields the hypothesis that domestic could be everything within one's nation.

Once a domestic economy frame is established, conceptual slots in the initial schema are instantiated and the aptness of the initial analogy has been evaluated as relevant, the second analogue is generated, this time within the target domain, after the neophytes have explored the implications of the initial analogy, domestic, which as a frame reminds some group members of *Yerli Malı,* a culture specific term, by which they bring their own interpretations from their cultural experiences and they remember a personal experience when they were at primary school, which would be a "mental scene" (Fillmore, 1985), indicated by their use of *that reminds me of.* In fact, *Yerli Mali* is a celebration held in Turkey to encourage consumers to consume domestic goods, a Turkish custom, the example of which consolidates the establishment of the domain-specific frame. This particular analogy might also correspond to an activity in the source domain, such as celebrating some family events like a birthday, or some other activities such as cooking, etc. which would also be elements of the source domain and each element corresponds to different collocates of domestic in the target domain. With *Yerli Malı,* Cenk makes an analogy between a familiar concept which he knows from his source domain, which is no longer *home or pets,* but Turkey and the Turkish economy.

Interpreted in terms of metaphor, the house in the source domain, can be analogued to a container in the target domain, as in Lakoff & Johnson's (1980) description. Container in this case is a special type of container which corresponds to a home or a house, inside which are various elements, pets, objects, etc. in A STATE IS A CONTAINER conceptual metaphor. Each of these elements might correspond to each element - citizens, firms, products, the collocates of domestic, in the target domain. These are the ontological correspondences, as discussed in section 3.9.2.5. In relation to epistemic correspondence (see Chapter 3), the underlying structural relations of *being close* and *staying within the boundaries of home* are mapped onto *living within the boundaries of one's country.* Analogical mapping

spontaneously generated by the neophytes is structurally consistent and systematic when the principles of "structure mapping theory" are taken into account (Gentner, 1983), and is in the nature of positive analogy, as described in Section 3.9.2.3.

In the uptake section, all groups ended up with *full uptake* following the debate, as illustrated below:

From some knowledge base to full uptake: *"Domestic means everything which is inside the country. Domestic citizens are the :people living in their motherland. Domestic inflation occurs when our currency loses its value. Domestic export occurs when we have a lot of goods, we sell them to other countries. Domestic production means producing something with using our own factories and goods".*

Below is the uptake of another group that started the debate with the knowledge of pet frame. It can be seen that analogical mapping continues in the uptake section. (See Appendix V for the TAP).

From only the pet frame to full uptake: *"In addition to domestic animals, we learned that domestic can also be used with goods, people, economy, prices and companies. For example, domestic citizens are Americans, Europeans, Australians, etc. These people live especially within their countries. Domestic companies have an effect on economy by manufacturing goods, for example some domestic companies in our country include Sabanci, Eczacibasi, Koc etc.(these refer to Turkish companies). Domestic economy is the economy of a nation. Domestic prices are the prices of goods sold in our country".*

The above group has gone beyond Turkey which the first group seems to focus on. This clearly seems to point to the fact that various clues from the concordance lines and learners' schema, background world knowledge are interacting in such a way that they can relate knowledge they acquire from the concordance lines to their native culture by giving illustrations from the native culture with the names of companies. As shown in the uptake section, new knowledge is *accreted* to the knowledge base and the initial knowledge base is *finely tuned.* Also, learners are well aware of the changes in the initial knowledge for the fact that they have monitored the process of integrating new information into their personal framework and consequently experienced changes in their own conceptual structures leading to "meaningful learning" (Ausubel, 1980).

Excerpt 4: From *inferiority complex* to *inferior goods*

An inferior good, to an economist, is "a good which people buy less as incomes rise. For example, they may switch away from margarine and buy more butter which they can afford with an increase in income, etc." (Wonnacott & Wonnacott, 1986).

Four group members' initial knowledge concerning the concept of inferior goods included "inferior is a kind of feeling and an inferior good could probably be cheap or a poor quality good". Yet the remaining three groups reported that they could not figure out much about this concept. After they were exposed to concordance lists of *inferior*, as the key word with related collocates, it was then that they were able to start analogical reasoning by mapping their existing knowledge onto domain-specific knowledge with the help of clues provided by concordance lines. The debate of one of the groups with prior knowledge is given below, following the concordance lines:

the commodity is an **inferior** good because the rise
Unless hamburger is an **inferior** good, it leads to
An **inferior** good, such as second-hand
the case of an **inferior** good. If the income
DEFINITION: **Inferior** goods are commodities whose
their purchases of such **inferior** goods as automobiles
buy less. Will all **inferior** goods, then, have upward
a good is not **inferior**, it must have a

The above discussion illustrates how much neophytes have gained on the basis of limited information. In this debate, analogy is drawn from a remote, specific domain, psychoanalysis domain, which has aided in bridging the gap between the existing knowledge and the target concept. Following the surface similarity, from the source domain, psychoanalysis, an inferiority complex which is a feeling of lowness and inadequacy, is consistently mapped onto *inferior goods*, goods of lower and poor quality in the target domain of economics, on a - one-to-one isomorphic correspondence. In other words, they have transferred the knowledge at a deeper conceptual basis than mere superficial similarities. In fact, similarity is widely recognised as an important determinant of transfer (Vosniadou & Ortony, 1995; Gentner, 1995). As stated by Vosniadou & Ortony (1995) similarity is implicated in the reasoning process because a successful and useful analogy depends on some sort of similarity between the source and target domain and a perception of similarity is said to play a major role in the sense of the key processes associated with analogical reasoning. Mapping was confirmed by the clue, second hand, an example of an inferior good, which constitutes an element in the target domain of economics. *Second-hand* seems to fit very well with the idea of inferior, with the idea that both inferior and second-hand goods would have some elements in common, as is generally understood.

The reasoning process concerning inferior goods could also be interpreted in terms of the UP-DOWN image schema, as explained in Section 3.9.2.5 in connection with metaphors. According to this schema, we tend to differentiate items in relation to their location along a vertical line, on the basis of which orientational metaphors like GOOD is UP and BAD is DOWN have originated. Similarly, the feeling of inferior, that is, feeling low, gives rise to the idea that an inferior good could be a good of poor quality. The framework of the debate is shown below:

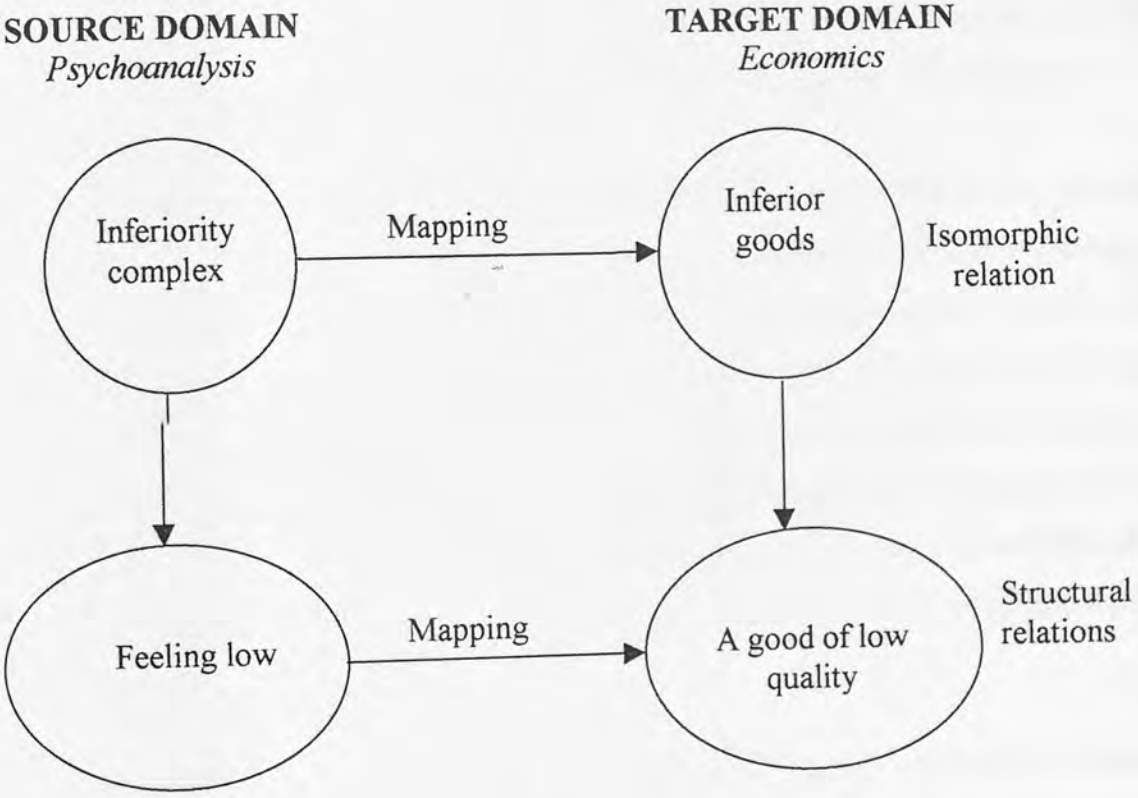


Figure 6.3 A Schematic Representation of "Inferiority Complex Analogy"

The initial hypothesis of neophytes *a good of low quality* guided them in their reasoning and this was further consolidated when their attention was attracted by *second-hand* which appeared to exemplify inferior goods. In fact, second-hand could be considered as a major distracter, here, because the general tendency among neophytes to conceptualise inferior was in the frame of "an inferior good as being a poor quality good, such as a second-hand good". A second-hand good could normally be considered as a very good illustration of an *inferior good.* However, as the debate unfolds, one can see a certain level of uncertainty over other

clues like hamburger and automobile, which also appear to exemplify inferior goods. The neophytes could not associate hamburger and automobile with the concept of second-hand goods.

Initial uptake of the above group was: *"Inferior good is a second-hand good. Hamburger could be an inferior good because we eat it everyday and finish it".*

However, an automobile was not considered as an example of an inferior good for these particular group members as they are used for a long time. In fact, this group was not quite sure why hamburger could be an inferior good, as they noticed the obvious contradiction between a second-hand good on the concordance line and the example of hamburger.

When assessed on the basis of the limited amount of information provided by the concordance lines, it seems fair to point out that they have reached a reasonable level of understanding and yet the initial uptake of all groups could only be assessed as *partial uptake*. The fact that the concordance lines covered *second-hand* could be considered as a factor in triggering knowledge of a second-hand good for all neophytes, which was not necessarily the same thing as an inferior good, as conceptualised by the discource community members, yet it could be considered as an approximation to that in the domain sense. The initial knowledge of other groups did not show any variation and inferior good was conceptualised within the frame of a "second-hand good" by all group members.

Following the debate, however, the groups were allowed to see the concept in a larger text, and were asked to define inferior goods again, to see whether it is the same or different as their first definition. It was found that this initial knowledge acquired gradually underwent refinement and the examples given in the initial knowledge base were replaced with new ones, as illustrated below:

Final uptake of the above group (full uptake): *"As the price of petrol goes down consumers would want to buy a car because of the change in the price. So, instead of travelling by bus they would travel by car. Bus becomes an inferior good".*

This was further extended with a personal example which was:

*"as my income increases I would want to eat lobster and would not want to eat hamburger. This time hamburger is an example of an inferior good. We can say that when demand increases inferior goods fall into the secondary position. For example, when people's income rise demand for foreign cars like Mercedes goes up while demand for home made cars like Sahin falls" * Sahin is a Turkish brand.*

Another group explained the difference between their final and initial understanding as:
"When income rises and demand falls some goods become inferior goods. For example, a person goes to a cinema two days a week. When his or her income increases he or she prefers to go to luxury restaurants instead of cinema. Here, going to cinema is an inferior case. Before, we had thought that if cinema tickets increase, people will prefer theatre tickets and theatre tickets are inferior. But now we think differently".

Yet, as in the group above, the initial uptake of the other group members acquired through the concordance lines was gradually tuned and modified after reading the text.

The final uptake of the other groups included: *"before, we thought that the meaning of inferior was poor quality goods. But, after we have read the text we learned the other meaning of inferior, which is the kind of good that loses its value and importance in relation to other goods. This means that it is an inferior good. For example, if our income was more we would prefer to travel by plane to bus. In this example, bus is an inferior good".*

What is particularly interesting in these groups' comments is that in addition to the use of analogy, another process is going on; they are able to draw a difference between their initial level of knowledge from the final uptake and are well aware of the progression in the process of concept formation and they are highly motivated by their discovery. Although the neophytes started with something different in their initial schema, they were able to integrate the target concept and even differentiate it from what they already knew, becoming aware of the developments in their knowledge base. They have learned what inferior goods means because they have become aware of the whole logic in terms of the UP-DOWN schema when higher-lower relations of the source domain are mapped onto the target domain. The group members stated that the initial generalisation they were able to draw in the debate was certainly not correct, yet, they admitted that there were some minor differences between their initial understanding and the last one.

The other groups all ended up with the same line of reasoning. Inferior goods by all group members was conceptualised as "a poor quality good, such as a second-hand good". The initial uptake acquired by all group members could be considered as a "partially instantiated

schema". In the final uptake, however, what seems to have been acquired appears to be a gradual mapping of the existing schema onto the new schema by a further process of analogical reasoning concerning different examples of inferior goods (see Appendix VI for more sample uptakes). As stated by Thagard (1985), learners add a slot and value to a frame and a frame is added to the existing frame and is integrated with existing knowledge by establishing its place in the processing system; new knowledge is useless unless a procedural connection with existing frames are in place. This also points to the nature of meaningful learning taking place. The kind of conceptual change that occurred corresponds to what Carey (1991) refers to as "weak conceptual change" or "weak restructuring" which occurs when the shift involved in the acquisition of knowledge implicates only previously available concepts.

In analysing the TAPs, in order to indicate components of knowledge being acquired within the discipline of economics we made a differentiation. We considered economics as the macro domain within which we identified some other more specific knowledge structures, to which we referred as frames, such as, *commercial exchange frame* or *substitute goods frame*, as will be shown in the following section.

Excerpt 5: From *a substitute teacher* to *substitute goods*

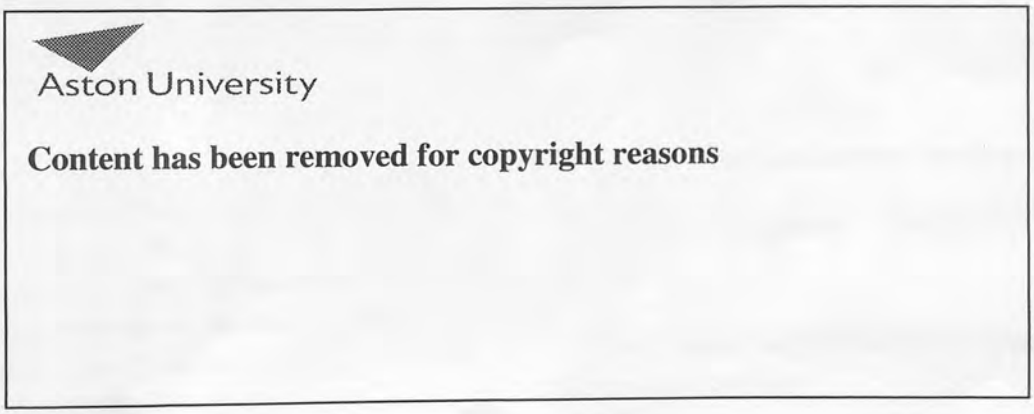
The next concepts debated during the intermediate stage were *substitutes and complements* which were used in economics in connection with substitute and complementary goods. In fact, these two concepts are defined by the expert members of the TDC as follows:

> "Substitutes are goods which are used instead of each other. If the price of oranges were to double while the price of apples remained the same, buyers would be encouraged to buy apples instead of oranges. Goods such as apples and oranges which satisfy similar needs or desires are substitutes. Other examples are given as tea and coffee, butter and margarine etc. For the complementary goods exactly the opposite relations hold. Complements are used together. For example, gasoline and automobiles are complementary goods" (Wonnacott & Wonnacott, 1986).

The initial knowledge of one particular group included *substitute teacher* and the others did not seem to have much knowledge. Yet, during the debate, they were able to bring a good deal of an interpretive frame, of background knowledge evoked by various cues to bear on the

interpretation process by applying analogical reasoning. This reasoning process continues until a consensus is reached by the learners in the meaning construction process.

rule about complements and **substitutes**: If two goods are
needs or desires are **substitutes**. Other examples are tea
corn and soyabeans are **substitutes** in production: They can
whether two products are **substitutes** or complements is their
as items can be **substitutes** or complements in consumption
identical or are close **substitutes**, and the outputs are
and oranges). similarly, **substitutes** in production are goods
We saw earlier that **substitutes** in consumption are goods



The neophytes, as in all other debates, are in the process of understanding a novel and an abstract concept in terms of the one that is familiar to them. At the language centre YADIM, where the present research has taken place, it is common for teachers not to turn up and

administration announces to the students that they will have a substitute teacher. Thus, in this group, Bahadir's attentiveness to *substitutes* triggers an analogy from his prior knowledge; the initial knowledge activated is a substitute teacher, a structural element and at the same time a slot in the frame within the source domain *school* or *university*, thereby the first emergence of analogical reasoning is initiated *(retrieval step)*. With this analogy, Bahadir makes a "mental leap" (Holyoak & Thagard, 1995) exploring connections between two different domains in the course of trying to understand an unfamiliar concept in terms of the familiar patterns of a substitute teacher.

When the relevance of this analogy was questioned by the group members as to its appropriateness for this particular situation, Bahadir retrieved a new and more abstract analogy from his food domain - a ready made soup substituting a home made soup. The two analogies were useful in bridging the gap between the two domains, helping neophytes acquire a new concept, substitute goods, which they did not know previously. Thus, the analogies derived are, as stated in Section 3.9.2.3, in the nature of "multiple analogies" (Spiro et al., 1989) where two analogies accessed from two different source domains are mapped on the same concept in the target domain.

There are many points to note in these analogies. Substitute teacher, *soup* and *substitute goods* have many underlying aspects in common. The object correspondences -teachers and soup are carried over from the source into the target domain by Bahadir on a one-to-one isomorphism and the function correspondences between the two elements are established by the relationship of *replacement*. Bahadir seems to know very well the particular underlying relations his analogies and the target concept have in common - one element replaces the other one, which is an important constraint in analogical reasoning. It can be concluded that, in these analogies, as in the previous ones illustrated above, substitute teacher and ready made soup map onto substitute goods not by virtue of their physical similarities but by virtue of their corresponding relations of replacement. Given this correspondence of objects, it can be argued that the relationship that holds among the analogies in the source domains also holds among the target concept, as in the case of Rutherford's analogy of the solar system and the atom. Though the two elements from the two remote domains are dissimilar with different surface features, common underlying patterns of relations exist among them. Thus, the reason

substitute goods are analogous to *substitute teacher* and *ready made soup* lies in the underlying characteristics of *replacement.*

Later, Bahadır evaluates the analogy and maps the higher-order relations, that is, one item is used instead of another. As stated by Gentner (1995), it is the identical relationship between the non-identical objects that leads to a subsequent change in the conceptual structure which will be demonstrated in the uptake section. This underlying relations also meets Gentner's (1983) *systematicy principle*. The framework of this debate is illustrated below:

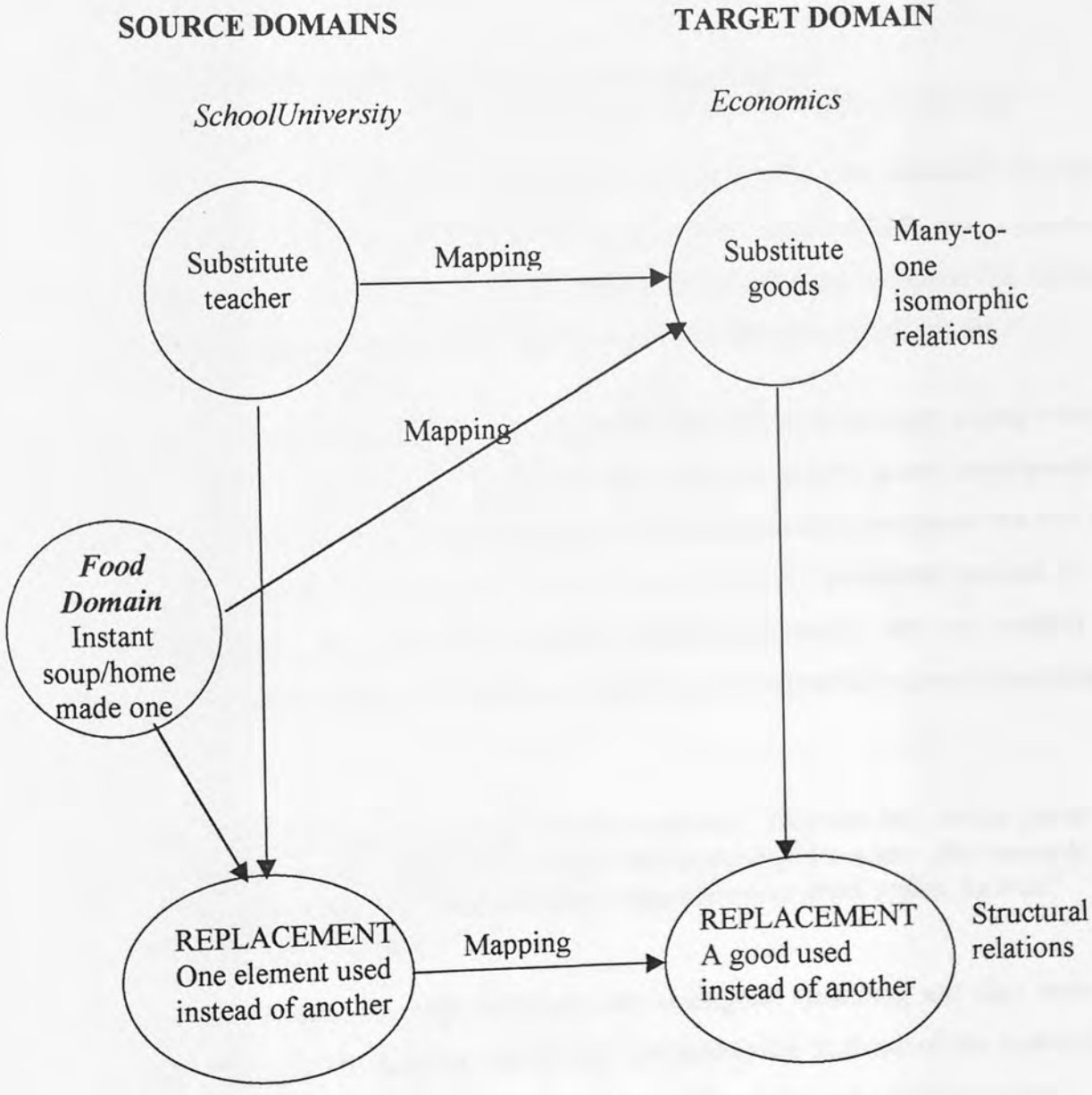


Figure 6.4 A Schematic Representation of "Substitute Teacher Analogy"

The two products were the main cues utilised for the *substitute goods* frame. After the establishment of the underlying structural relations, neophytes were able to construct the domain specific meaning, accommodate it into their existing schema and *complete the mapping process*. The mapping process also helps them fill in the initial slots in the schema concerning the new concept. With the help of this process, the initial assumption they started with undergoes a constant evolution; they move from the superficial similarities to a structural similarity given that a *substitute teacher* and *substitute goods* are related.
At the end of the debate, the uptake shows that neophytes were able to reach the stage of full uptake, as shown below and that a conceptual growth has taken place.

From some knowledge base to full initial uptake (of the above group):
"Substitutes are goods that are consumed instead of each other like apple and orange".

In fact, this brief uptake shows the macroproposition of what has just been debated, whereas in the debate each idea represents a microproposition. And uptake shows that conceptual development has taken place leading to the acquisition of the concept. Interpreted in the light of how economists conceptualise substitute good, this can be considered *full uptake*.

In addition to the above group, there was another group that employed analogy during concept formation and ended up in full uptake. In fact, this time the second group conceptualised substitutes in the sense of *raw materials analogy*. The reason for this was due to the fact that the examples given in the concordance lines such as tea, corn, soyabeans evoked in the learners raw materials, as stated by the group members, "because they are needed for production". At the initial uptake the group, as in the first one, was able to acquire meaning of the concept as:

"Substitutes are goods which satisfy similar needs or desires. They are two similar goods but one of them is cheaper. People choose the cheaper one instead of the other. For example, tea and coffee. Not everybody can drink tea but others may choose to drink coffee, instead" .
(see Appendix VII for the debate).

The remaining group members could not apply any analogical reasoning and they came up with different levels of understanding, which did not correspond to those of the members of the TDC. They were, thus, provided with more information which enabled them to acquire the meaning of this particular concept. This seems to confirm the argument that analogical

reasoning, if it can be employed by the learners particularly at the initial stages of acquiring the knowledge of a target domain, is useful in bridging the gap between their existing knowledge and that of the knowledge of the target discipline. The consequence of this finding would be to teach students how to make use of analogical reasoning and encourage them to try and find some analogies between the new concepts and their existing conceptual knowledge.

Yet, no problem was encountered in the case of *complementary goods* which were conceptualised as "goods that depend on each other, for example, phone box and coins these two things complement each other. You have a TV set but you do not know where to put it, so you need a furniture. Here furniture is the complement". This was largely due to the meaning of complement they had learned at school in the sense of two items complementing each other. The fact that a totally different example is given from the one that occurred in the debate indicates that assimilation of knowledge is taking place.

Towards the end of the intermediate stage in knowledge acquisition, there was a gradual change from between-domain analogy to within-domain analogy, which marked the beginning of the advanced stage of knowledge acquisition. A gradual change was beginning to be seen in the nature of the analogies employed by the neophytes; as they were accumulating more knowledge of the target domain, they were drawing analogies within the target domain itself, i.e. they used "within-domain analogy" more frequently than "between-domain analogy" (Vosniadou & Ortony, 1989), the target domain being economics and business studies. *Between-domain analogies* were those which belonged to fundamentally different conceptual domains but which shared a similar explanatory structure as in the case of Rutherford's analogy between the solar system and the atom. The kind of analogies illustrated so far constitute examples to between-domain analogies. In the case of *within-domain analogies,* however, reasoning operated on items that belonged to the same very close conceptual domains. This will be illustrated in the following debate.

Excerpt 6: *Retailers*

Neophytes' existing knowledge of retailer included "retailers could be a kind of seller or marketer". As stated previously, in the analyses of the TAPs, a distinction was drawn within the target domain of economics, and many specific frames, such as *the commercial exchange*

frame or *the production process frame*, etc. In the following debate, for instance, the reasoning process takes place within the commercial exchange frame.

main types: wholesalers and **retailers**. Wholesalers sell primarily to
intermediaries between producers and **retailers**. For many years these
Departmentalized food stored. Door-to-door **retailers**. A door-to-door retailer
to motivate wholesalers and **retailers** to push a producer's
products of their own. **Retailers** sell to individuals who
at inducing distributors or **retailers** to push a producer's
Retailers in contrast to wholesalers
In contrast to wholesalers, **retailers** are a visible element

Gentner (1983) has drawn a distinction between object attributes (descriptive properties of objects) and relations (complex, relational properties of objects) and has argued that the latter is more difficult to access. In this debate, neophytes have initially drawn descriptive

properties of the analogue between a seller and a marketer that a seller could be a kind of marketer. In the above debate, there is the presence of similarity in the relations involved between a seller, and a wholesaler and retailer within the same *commercial exchange frame*, which is the target domain in which reasoning takes place. The fact that wholesaler and retailer could be a kind of seller is probably derived from the linguistic knowledge of learners - the ending suffix (-er) and that both are involved in the business of selling. Similarity also exists in the attributes of these elements in that they are all people engaged in some kind of selling activity. Although the analogy drawn rests on many similar properties, the reasoning process is analogical in that it rests on the mapping of an explanatory structure between the elements in the target domain. Though the surface similarity is well understood by the neophytes, as stated by Vosniadou (1995) the defining characteristics of analogical reasoning is based upon similarity in the underlying structural relationship. In other words, seller is used as a source, from which to reason analogically. Furthermore, unlike the previous analogies in which structural similarities are found between items that belong to different conceptual domains, in the present analogy, structural and functional similarity is found between items that belong to the same domain.

It has been pointed out by Vosniadou (1989) that a different psychological process seems to operate on analogies drawn from the same conceptual domain, i.e. within-domain analogy. Between-domain analogues do not share similarity in non-analogy related surface properties, they may be accessed only by noticing the similarity in their underlying structural relations. Vosniadou (ibid.) argued that within-domain analogues can be identified on the basis of their similarity in simple, descriptive and easily accessible properties which may not have anything to do with the analogy at first place. In fact, neophytes mapped the underlying conceptual relations that somebody who sells is a seller and similarly a wholesaler and a retailer are a kind of seller.

The framework of the underlying relations of the analogy is illustrated below. Since reasoning takes place within the frame of commercial exchange, no differentiation has been made as the source and the target domain. However, one-to-one correspondence can be found between the components of sellers and related elements of wholesaler and retailer.

Within – Domain Analogies

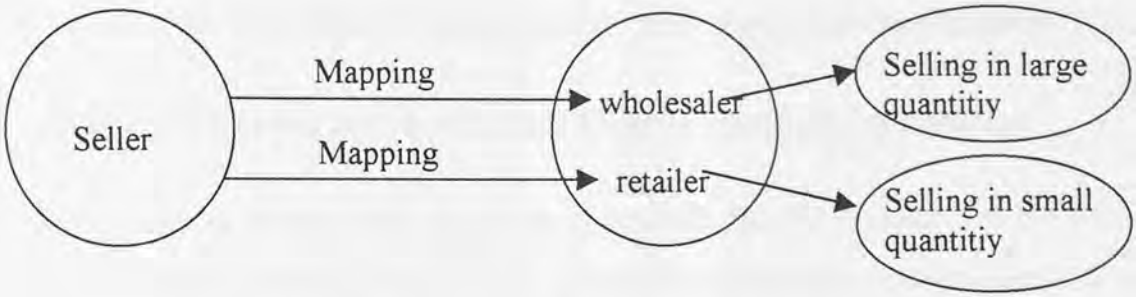


Figure 6.5 An Illustration of "Within-Domain Analogy"

A parallelism can be found between what is debated and what is acquired.

From some knowledge base to full uptake: *"It is a kind of selling. There is a kind of retailer called door-to-door retailer who respond by asking some needs. For them promotion is aimed. Retailers buy their products from the merchants at low cost. Then, they put a price on it and sell them to individuals".*

All groups ended up in full uptake as illustrated in the uptake of another groups.

From some knowledge base to full uptake: *"Retailers are the people who sell a product to consumers and take goods from wholesalers who are at the invisible side of this trade".*

When asked what helped them arrive at the meaning, neophytes stated that some words like *door-to-door retailer* and *sell to individuals* were among the helpful clues. In the retailers frame, the slots could easily be identified in relation to Fillmore's case grammar (see Chapter 3). The word *retailer* is based on an action verb to sell. People, like a retailer and a wholesaler, take the agent slot of the action, whereas what is bought and sold, such as pens or apples, constitutes the object slot. Money which is used in this transaction would correspond to the instrument slot and the location slot is filled by such fillers as door-to-door, as mentioned by the neophytes in the TAP.

It can be argued that despite the fact that neophytes did not know much about the commercial exchange frame, the analogies generated and the underlying common structural relations explained by them have contributed most to the acquisition process. This is born out by Vosniadou (1995) who confirmed that analogical reasoning can contribute most to acquisition of new knowledge in the situation where the underlying structure needs to be present only in

one's representation of the source domain. The fact that the neophytes already had a retailer frame and currently some retailers travel door-to-door in order to market certain products in Turkey might have triggered the retailer frame easily in the neophytes. This point will be discussed in more detail in relation to advantages of concordance lines (see Chapter 7).

6.2.3 Analogical Reasoning at the Advanced Stage in Knowledge Acquisition

Based on the analysis of the TAPs, it can be concluded that the transition to the advanced stage in the neophytes' development of domain-specific knowledge occurred about 10 weeks following the intermediate stage with a parallel growth and maturity in their level of English. The main features of the advanced stage can be characterised as follows:

1. Growth in the neophytes' domain-specific knowledge: This was due to the enculturation studies being carried out at YADIM as well as the weekly visits paid to the target faculty. During these visits, all neophytes participated in the lectures which helped them acquire more domain-specific knowledge. This growth was reflected in the amount of knowledge they contributed during the debates. There was also a growth of domain-specific knowledge as reflected in the initial knowledge base of neophytes, as illustrated throughout the debates in this section.

2. Within-domain analogy or within-domain reasoning: At this stage, there was also a tendency to draw upon domain-specific schemata during the initial knowledge as well as during the process of debating. Of all the debates analysed during this stage, in 84% of the debates, there was *within-domain analogy*, while the rest (16%) showed *between-domain analogies*. With a developing degree of learner expertise, access to previous knowledge which was in the nature of general world knowledge, gave way to domain-specific knowledge. Analogy, at the previous stage was determined by some sort of salient similarity in the properties of the source and the target domain, but what is salient similarity has changed as neophytes' conceptual representations have become reorganised with the acquisition of knowledge (Vosniadou, 1985). Once the learners started reasoning within the target domain of economics, there was not much to analogise to and that in many instances of analogical reasoning, transfer of relational structures is not needed because relational structures already

existed in the target domain. Therefore, reasoning has occurred mainly within the domain of economics itself, with examples drawn within the same domain related to the Turkish culture, occasionally activating *between-domain analogies.* The debates were also increasingly conducted in English.

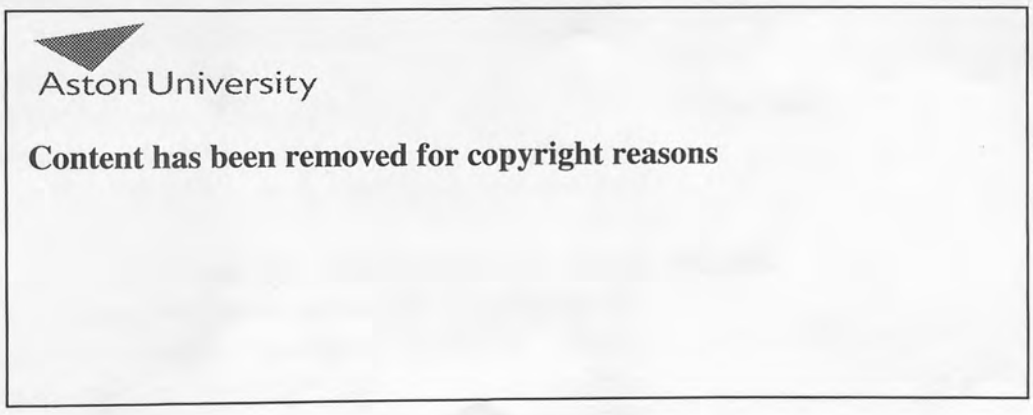
3. Activating various sub-frames within the general frame: Another distinguishing feature of debates at this advanced stage was that the whole discussion proceeded within one macro frame, (tax) under which various sub-frames were discussed (definition of tax and examples of taxes, etc.) introduced by some concordance lines. These features will be illustrated in the following debates on *monopoly* and *fiscal.* In addition, Appendix VIII encloses both the debate and uptakes of the neophytes on some other concepts, *wholesaler, unemployed, bonds and shares*, illustrating the same point.

Excerpt 7: *Monopoly*

Unlike other words which have an existence outside the domain of economics like scarce, substitute, bargaining, promotion, the meaning of monopoly exists predominantly in economics, except the boardgame, therefore there was nothing for the neophytes to analogise it to. They started to exemplify by drawing upon examples from the Turkish firms, businessmen, etc. matching the input to native culture and economy and have frame-related discussion around the subject-specific concept *monopoly.* In most cases, the learners' initial schema contained fairly general knowledge on monopoly, such as "a monopoly is a firm". Later, however, the initial knowledge of monopoly interacted in quite complex ways with linguistic features coming from the concordance lines, T-D and B-U reasoning interacting simultaneously as stated in the schema theory (see Chapter 3), to provide an adequate interpretation on monopoly which helped them to acquire more complex information.

Monopoly to an economist "is a market in which there is only a single seller" (Wonnacott & Wonnacott, 1986:54).

the spectrum, there is only one **monopoly**, with only one seller
Perfect competition and natural **monopoly**. Note that average costs
.way, significant areas of **monopoly** exists in water, local
.degree of competition or **monopoly** power in the industry
studied. Definition: A pure **monopoly** is defined as a
a profit-maximizing **monopoly**, that monopoly will raise its price.



The initial uptake of the above group includes: *"In monopoly there is only one seller. They set the price themselves because they are the producers. For example in Turkey TEKEL is the only cigarette producer".*

The full uptake of the same group: *"Monopoly is a kind of organisation where only one seller exists. Only one firm is able to produce and sell a product. There is no competition in pure monopoly. Some goods and services must be monopoly (natural monopoly) such as water, gas and electricity. For example, let's give Turkey as an example. Let's say only Sabanci produces textile and nobody other than Sabanci gets involved in textile industry. For this reason this is a natural monopoly. Sabanci holds monopoly, because Sabanci is a well-known firm in Turkey and the other firms don't think that they can sell that much as Sabanci. Therefore, they wouldn't want to get involved in the textile industry. So this brings natural monopoly".*

Sabanci, referred to by the neophytes above, is a famous Turkish businessman. As emerged in the neophytes' uptakes, various frames are activated in relation to the native culture, that is, references were made to the native culture by giving examples.

The fact that the enculturation studies were carried out concurrently in two contexts, that is, YADIM and DECOBA, the frequent visits paid to DECOBA showed positive effects on the knowledge acquisition process and seemed to be a factor in accelerating growth in domain-specific knowledge, as will be illustrated in the following debates.

Excerpt 8: *Collective Bargaining*

Collective bargaining is defined as "the negotiation between a union and management over wages and working conditions" by the economists. (Wonnacott & Wonnacott, 1986:693).

To assess the initial knowledge base in relation to this concept, neophytes were asked what they knew about bargaining in general and what collective bargaining in economics could be. All groups had similar knowledge bases: "Bargaining is trying to decide what the price of goods or services will be between buyers and sellers". Alternatively, "when you buy something, you try to buy it cheaper by trying to persuade the seller and this means bargaining". Collective bargaining, on the other hand, was conceptualised as carrying out the bargaining process together with more than one person involved. For one group, collective bargaining meant common market and the example given to support this idea was related to determining the price of certain products together with all the producers involved, for example the price of coca cola being decided by all the coca cola producers all over Turkey so that the same standard price would be applied everywhere. It was also suggested by the neophytes that some companies determine the price of the product together like the price of a particular brand of blue jeans as an example of collective bargaining.

As is clear in the following debate, neophytes activate various sub-frames within the macro-frame, assigning values to conceptual slot fillers in an attempt to instantiate slots in their schema. They are trying to understand what meaning discourse community members might have assigned to the particular concept in question. In addition, neophytes relate what they already know to the new concept, adopting the existing knowledge to a new situation and interpreting current knowledge in terms of old knowledge, by means of an analogy.

be discussed in collective **bargaining** mediation process for resolving
at the end. Collective **bargaining** and strikes. The process
Strikes. Most collective **bargaining** situations do not
system of public collective **bargaining** that will protect the
process known as collective **bargaining** together, union and management
for example, a firm **bargaining** with a union that
economic purpose. But public-sector **bargaining** is different
negotiators return to the **bargaining** table to try to
negotiators sitting around the **bargaining** table to try to
may come to **bargaining** table with extreme positions
likely that the union's **bargaining** position would be quite

Neophytes initially started within the frame of *bargaining at a market* which takes place between producers and consumers and tried to match certain aspects of the source domain by means of this analogy and that of the collective bargaining frame, trying to find common points between the two. The first illustration drawn from the source domain involved a car seller negotiating with the tyre producing factory over the price. In this analogy, car producing factory corresponds to the *producer*, while the car seller to the *consumer* in the *bargaining at a market analogy*. However, this analogy is gradually mapped on the collective bargaining taking place between the union and management. From "negotiators return to the table to try" on the concordance line, a gradual transfer is initiated, mapping this idea onto the collective bargaining frame and thereby building up this new frame. What helped this analogical reasoning were words like, *management, strike, contract* which were the fillers in this process. They stated that since people can bargain collectively so can the unions to

defend the rights of their workers. As the debate unfolds there is more integration of knowledge as evidenced from *sitting around the table*, another cue which evoked the notion that both sides sit at a table to negotiate which was, through inference, hypothesised to be wages and salaries. The whole process shows that domain-specific knowledge is gradually emerged and constructed not only with the help of cues but also with the collaborative contribution of group members to the debate.

From some initial knowledge base to full initial uptake (of the above group): *"Collective bargaining is a kind of agreement between producers and buyers. It can also be an agreement between management and trade union. We think trade union might be a kind of organisation. It is aimed at saving the workers' rights against management. Therefore they discuss and come with many alternatives"*

On the basis of the information supplied by concordance lines, which do not seem to provide many clues as to what union might mean, the above uptake can be considered as a full uptake. The mental scene created by neophytes during this debate is illustrated by Figure 6.6 on the next page, based on "frame specific semantic role categories" which is a more recent development by Fillmore & Atkins (1992) of the familiar repertories of agent, patient, etc.

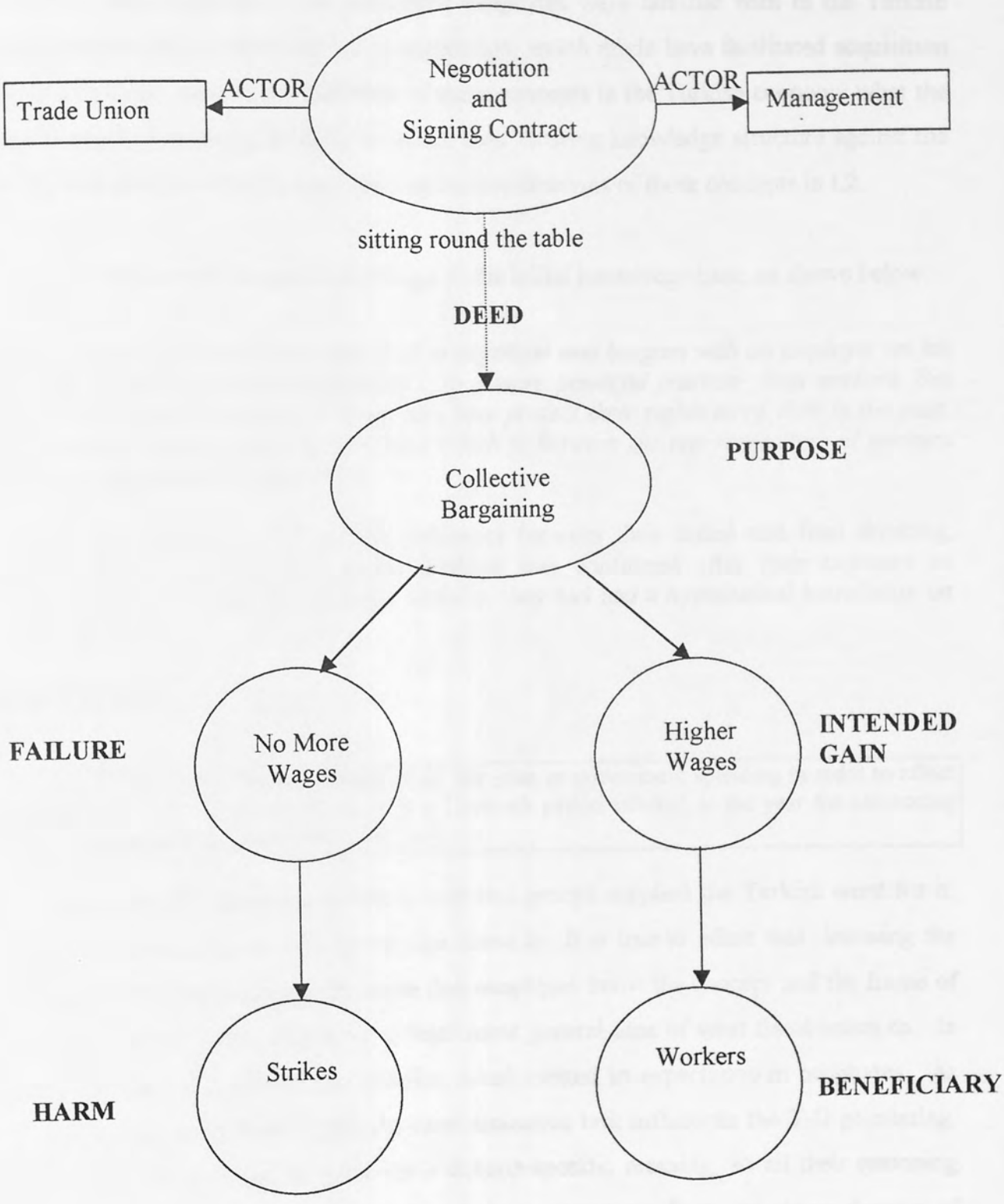


Figure 6.6 A Collective Bargaining Frame

A collective bargaining frame was something neophytes were familiar with in the Turkish economy, besides union, strike and wage negotiation, which might have facilitated acquisition of the new concept. Due to the existence of these concepts in the Turkish economy what the neophytes seem to be trying to do is to match their existing knowledge structure against the linguistic data provided and discover the linguistic realisations of those concepts in L2.

All groups ended up with accreted knowledge to the initial knowledge base, as shown below:

"Before trade unions existed, a worker had to negotiate and bargain with an employer on his or her own. Employers were almost always in a more powerful position than workers. But now because of the trade union, the workers may protect their rights more than in the past. Collective bargaining is a kind of treatment which is between the representatives of workers and the representatives of employers".

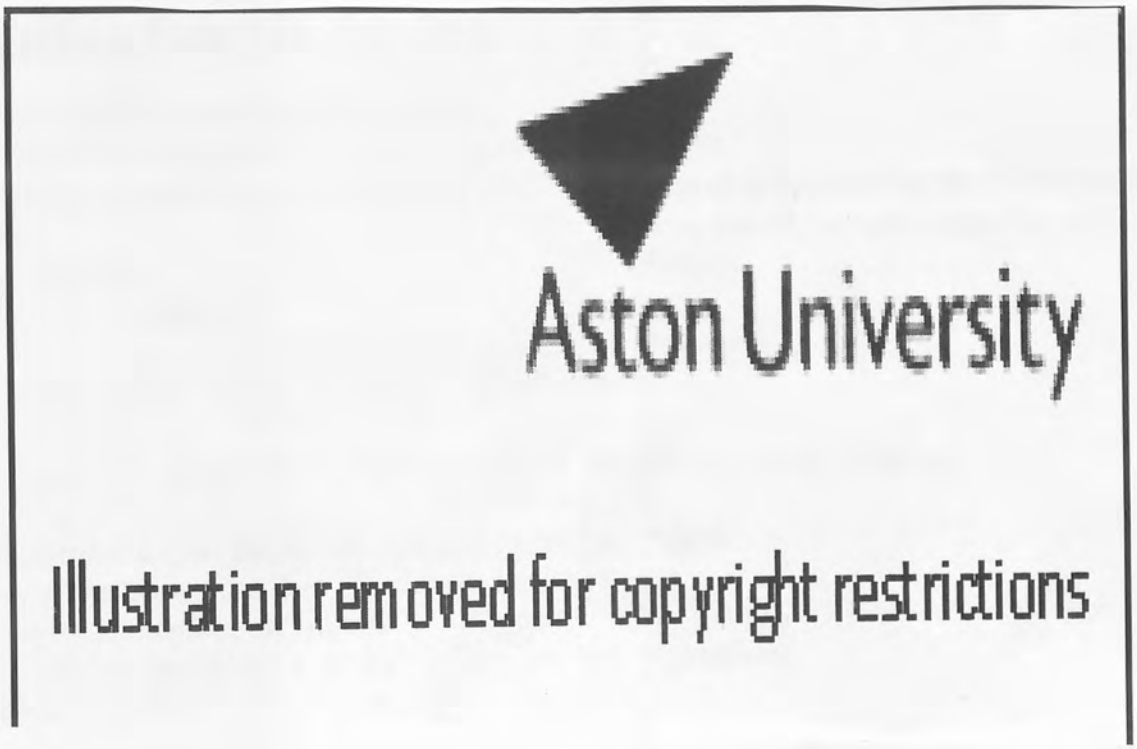
When they were asked to find out the difference between their initial and final thinking, neophytes pointed out that their initial thinking was confirmed after their exposure to concordance lines, yet they admitted that initially, they had had a hypothetical knowledge on collective bargaining.

Excerpt 9: *Fiscal*

Fiscal policy is defined as "the adjustment of the tax rates or government spending in order to affect aggregate demand. As for the fiscal year it is a 12-month period selected as the year for accounting purposes". (Wonnacott & Wonnacott, 1986:167)

When asked what they knew about *fiscal*, only two groups supplied the Turkish word for it, while the rest could not state any knowledge about it. It is true to admit that knowing the Turkish word does not automatically mean that neophytes know the concept and the frame of reference, but it shows that they have at least some general idea of what fiscal refers to. In fact, as in the previous debates, the question asked created an expectation in neophytes. As stated by van Dijk & Kintsch (1983) the communicative task influences the T-D processing. Students knew that they had to work out a domain-specific meaning, so all their reasoning involved activating concepts, frames and knowledge structures from the macro-domain of economics, which enabled them to allocate their inferencing related to this process.

while to adopt tight **fiscal** and monetary policies aimed
to printing money if **fiscal** action is not taken
the 1976 campaign: If **fiscal** and monetary policies are
the government can use **fiscal** and monetary policy to"..
"is insufficient, monetary and **fiscal** policies"....
solution. Tight monetary and **fiscal** policies could impose.."
examine the use of **fiscal** policy to stabilise income"...
ends on December 3. **Fiscal** Year any consecutive.."
government bodies use a **fiscal** year, which may be



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In this debate, *monetary policy* acted as the initial clue, helping neophytes to understand that fiscal could be the government's other policy. The words *solution* and *tight monetary and fiscal policies* activate a *solution script* which involves *austerity measures* introduced by the then Turkish government to help solve some economic problems, which is an example of within-domain reasoning. Unlike the restaurant script in Schank & Abelson (1977) which has a logical sequence of the actions (see Section 3.2.3 for details), the *solution script* in the debate on *fiscal* above, is constructed at the time of processing the incoming information. Another script activated by the neophytes which is particularly noteworthy is the *unemployment script* (see Appendix VIII for the debate on *unemployed).* The debate on the problem of *unemployment* triggers a *solution script* which activates various elements of a *solution scene* in Tugbay's mind, which he later relates to his own experience. Both scripts consist of a series of actions which need to be taken as a solution to a specific problem.

The following is the uptake of the above group.
From no initial knowledge base to full uptake: *"Government has a fiscal policy which involves collecting taxes from the businessmen. This policy is concerned with the distribution of income".*

For another group's members, fiscal was first related to their everyday experience and later to the policy.

"Fiscal means budget. When we take our salary we prepare monthly budget we divide our spending and list them. The government prepares a fiscal like us but this fiscal is very big. Sometimes, the balance of fiscal is upset so the government faces a financial and economic problem. Therefore the government's fiscal policy must be prepared by professional people".

In the case of this particular concept, group members stated that they found the *date* which is given for the Fiscal Year on the concordance line as a useful clue in confirming their initial conceptualisation of *fiscal*. When asked why the date was found particularly helpful, their reply was: "because government, businessmen, people, firms and companies have to pay taxes during the fiscal year".

When all groups were provided with more information related to the same concept, with which they could compare their understanding whether they had reached the level of shared

understanding with the members of the TDC, their initial uptake was expanded even further. It can be concluded from the uptake of the debates above that acquisition of knowledge is a process in which with every exposure to new input further knowledge is added to the initial knowledge base, as illustrated in Michalski's Trumpet Model (see Section 3.4.4).

In Section 3.5.3, three types of processes were described, namely, *accretion, tuning and restructuring*. Analogies presented so far were examples to the first two types. In the acquisition of domain-specific knowledge, several instances of the restructuring process were recorded. The following section deals with how this particular process has occurred.

6.3 Restructuring in Knowledge Acquisition

In the restructuring process, initially acquired knowledge following the debate was entirely inconsistent with the expected knowledge of the members of the TDC. This inconsistency changed when the learners were exposed to more information from the text, which led to acquiring a new schema which was imposed on the previously acquired knowledge, leading to either a "strong restructuring or strong conceptual change" or that of "weak restructuring (weak conceptual change), according to Carey (1991). The first occurrence of generating negative analogy which resulted in *restructuring*, took place at the intermediate stage while debating *specialisation*. Some group members conceptualised specialisation as *privatisation*. Below is the uptake, based on the following concordance lines:

Excerpt 10: From *some prior knowledge* to *restructuring*

the next chapter. **Specialization** contributes to efficiency
contributes to efficiency. **specialization** requires exchange.
gain by specialization. Before **specialization**, their combined output was
there are gains from **specialization** to exchange: comparative
advantage, both gain from **specialization**. British economist David Ricardo
chapter, the advantage of **specialization**. Exchange takes place in
gardener also gains through **specialization**. Although he has to
and 2.000 landmowers. After **specialization,** they together make 2.500
EXCHANGE: THE ECONOMY. **Specialization** requires exchange. Farmers who
the advantages of **specialization.** Exchange takes place in

Although three of the groups ended up their debates with the expected meaning of specialization using the clues such as *gain, before and after specialization* and *exchange*, for

the remaining four groups there was confusion over specialization with the government's privatisation of industries as stated in their initial knowledge base below:

"Specialisation is the basis of government's selling of its foundations. Government makes specialisation for two reasons. First, to get money, the government sells resources that he has got which he uses in different fields, like education defence, etc. Second, government has too many responsibilities like education, employment transportation. So, it is hard to care for all of them. Therefore, the government can specialise transportation so that it can care for other industries better".

The reason for this confusion could be attributed to the interference of L1. Due to the fact that *special* means *private* in L1, specialisation was considered in the sense of privatisation by most group members. In other words, in Turkish there is only one word "özel" which corresponds to special and private in L2. This created a situation in which neophytes, who knew the L1 word, came up with a different concept. In Section 3.2.3, it was assumed that a word is introduced with a concept and knowing a word means knowing the concept. It was also assumed that vocabulary for the concept is activated along the script. In fact, when loan words are introduced into Turkish with the concept of the word, no problem has been seen to occur, as in the case of *monopoly, delivery, inflation*, etc. However, based on the evidence from the present research, it can be argued that knowing an L2 word does not necessarily mean knowing the corresponding concept. From the meaning of special (özel), learners formulated specialisation in the sense of privatisation of industries (özellestirme). Whereas the analogies such as, the *substitute teacher* and *inferior goods* generated have been most effective in characterising the underlying relations, the one on specialisation failed to identify such underlying causal mechanisms. As a consequence, learners accessed a "false analogy", leading to a negative analogy. Such false analogies can also be explained as learners' attempts to reconcile their prior knowledge with information coming from the input. Ross (1987) and Vosniadou (1995), have both argued that the easy accessibility of surface similarity sometimes becomes the motivating force for selecting the wrong analogues between the target and the source domains. Even negotiation did not help modify this initial frame of reference, as is clear from the initial uptake produced by group members below:

"Specialisation means making something special. It belongs to government and is used for selling the resources of the state in order to earn income. Generally these resources belong to the state. They can be sold completely or partially to increase the income of the nation".

The initial uptake went through a process of *strong restructuring* in the final uptake, the neophytes having been exposed to a larger context, as shown below:

"Although we explained specialisation as the selling and buying resources, in the text it is explained as division and sharing responsibilities. By the help of specialisation, production will increase and government will gain by specialisation. In an economy with specialisation exchange is needed. Exchange is an advantage of specialisation. The British economist David Ricardo found out a trade theory about specialisation and by the help of this theory Britain began to lead in the international trade as a result of specialisation".

The schematic representation of restructuring is illustrated with the following figure.

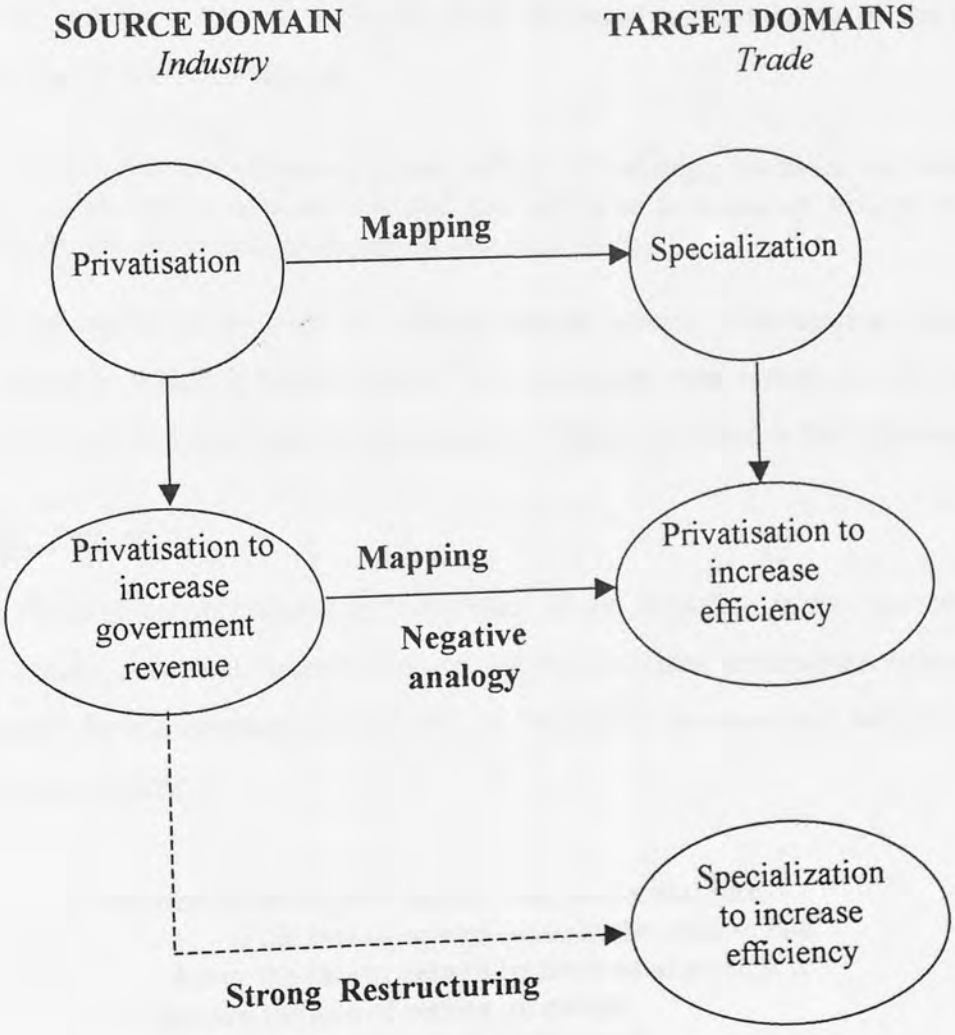

Figure 6.7 A Schematic Representation of Specialisation

As shown in Figure 6.7, *privatisation* in the source domain is mapped onto *specialisation* in the target domain. In terms of the underlying structural relations, the idea of privatisation to increase government's revenue is arrived at by means of inferencing, which corresponds to *specialisation to increase efficiency* in the specialisation domain. In fact, the analogy generated by the neophytes fails to correspond exactly to the definition of the members of the TDC, therefore it is in the nature of a *negative analogy*. However, after the neophytes were provided with more information, they became aware of the inaccuracy of their initial schema and the initial uptake was radically replaced with new knowledge structures which consequently became consistent with the level of shared understanding of the members of TDC. They stated this difference as:

"We first thought that specialisation meant selling of buildings, factories, etc. which belongs to the government. But we now learned that specialisation is a kind of division of labour and countries specialise in producing the goods that they do best".

The whole process is an example of "strong domain specific restructuring" (Carey, 1991). Another debate in which a false analogue was generated was *return on (X),* leading to a mismatch between the initial and the final uptake. This is described in the following section.

Excerpt 11: *Return*

Return on (X) was conceptualised by neophytes in the *recycling frame*, accessed from the domain of industry, whereas return was a concept that belonged to the *investment domain*, and was considered by the members of the TDC as "a yield of an economic activity, i.e. profit". This is illustrated below:

investment is the highest **return** that money can earn
if the rate of **return** exceeds the interest rate.
hence the rate of **return** on household savings is
receive the rate of **return** on capital
this represents a real **return** of only 2 per

The initial uptake of one of the groups was: *"It could be doing something for reusing it. For instance, newspapers are good examples for this. They are collected after being read and returned to factories again for new supplies".*

Yet, the analogical reasoning was not of much help, as *return* for these groups was interpreted in the *recycling frame*, in other words, a false analogue (Novick, 1988) was drawn leading to a negative analogy as demonstrated in the initial uptake, above. Two reasons can be pointed out for this result; one is due to the insufficient information provided by the concordance lines. For the group members who started their debates with such an initial schema as explained above, concordance lines did not supply adequate information. Another reason is that as noted by Vosniadou (1987), the easy accessibility of surface similarity sometimes becomes the motivating force for selecting the wrong between-domain source analogies. The group members seemed to pay attention particularly to surface similarity and associated *return on X* with "an item being used, like paper, thrown away, going through a process of recycling and returning to us as a new product", which resulted in the negative analogy.

It was only after the neophytes were provided with more information that they were able to acquire a domain-specific frame of *return,* as in this extract:

"People and firms invest in skill, plant and machinery and they expect many things from their investment. These things are called return. For example, government invest in education so that they will build our future".

The figure below illustrates the restructuring process:

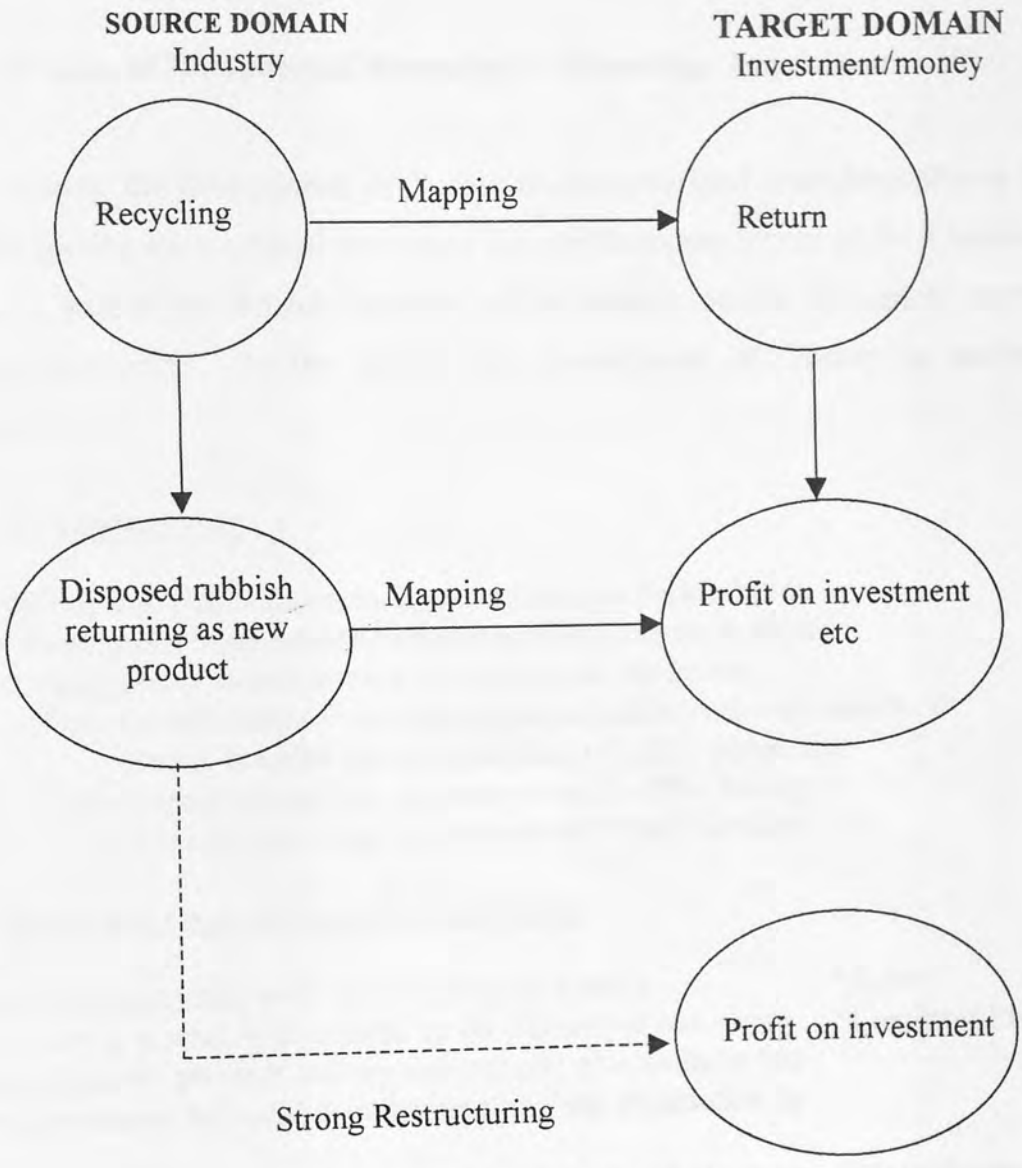

Figure 6.8 A Recycling Analogy

It was mainly the words *money circulation, return on capital, market rate of return, investment is the highest return, earning* all words collocating with money that were found particularly helpful in evoking the domain specific meaning of return.

In Section 3.9.2.5 of the thesis, it was stated that analogical and metaphorical reasoning strategies are related and the common as well as the different points between them were discussed. In addition to several analogical reasoning processes employed by the neophytes as described above, such as in connection with the domestic economy, in several other debates

reasoning was based upon several metaphors. The following section discusses metaphorical reasoning in knowledge acquisition.

6.4 Contribution of Metaphorical Reasoning to Knowledge Acquisition

In many debates, the development of Turkey is conceptualised metaphorically as a PATH, such as her joining multinational institution like the European Union or the Customs Union. Following is part of the extract from one of the debates on the concept of *consumption*, illustrating this point. In the debate, the development of Turkey is conceptualised metaphorically.

Excerpt 12: ***Consumption***

oil imports. Hence domestic **consumption** per person has to
divert goods from domestic **consumption** to export in order to
consumption now and more **consumption** in the future.
of certain individuals from **consumption** is effectively impossible. In
benefit, but also the **consumption** of public goods that
may simply reduce their **consumption** of coffee, buying it
down on their total **consumption** of fruit. Similarly, the

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In addition to the use of a CONTAINER schema, (see the debate on *domestic*) the PATH metaphor was also made use of by neophytes in conceptualising an abstract concept of Turkey's economic DEVELOPMENT. In the above debate, the dimension of development is conceptualised metaphorically through a combination of PATH, JOURNEY and CONTAINER metaphors, all of which are part of the image schemas (Lakoff, 1990) and movement metaphor. In other words, Turkey's development is conceptualised in terms of the following conceptual metaphors:

Development is a JOURNEY
The European Union (EU) is a CONTAINER

The dimension of the development, is conceptualised metaphorically through he PATH schema. As pointed out in Section 3.9.1.5, the PATH metaphor involves structural elements such as a starting point (origin) which corresponds to the present state of the country, a destination which is the endpoint and a path toward the destination which involves a goal-oriented journey as shown below:

	PATH	
Origin----------→		**Destination**
Present state of Turkey	*Travellers* (Turkish people = actors) Missions to reach destiny Working hard Increasing export Bringing down the rate of inflation and unemployment	*The EU* (Container)

The relationship between the two is metaphorical in the sense that there is a mapping of some kinds of correspondences and relationships established in the learners' minds. The travellers in this journey are the Turkish people (actors in Fillmore's sense) who have a specific mission to carry out in order to reach their destination which is an international institution, the EU, which is also the end-point of the journey. Even more, Turkey (one container which is moving) is inside another container (joining the EU). In the above debate, metaphorical reasoning starts when one of the neophytes says "we must join European union if we want to

be a developed country". The EU can also be linked to the CONTAINER metaphor. It represents a container, since entering into it and being a member of it is conceived as a necessity by the neophytes in order to reach the level of the developed nations, i.e., travelling to the destination DEVELOPED NATION (as an additional destination to EU), whereas remaining outside this container means less developed or a developing country.

The path is a specific kind of path which represents the journey that the Turkish people have to travel. A journey is of a goal oriented nature and is conceptualised by neophytes as leading to the development process. However, the path to the destination is not without its impediments; there are certain requisites and missions for the Turkish people to carry, entailments of "working hard, increasing export, bringing down the rate of inflation and unemployment, etc.".

As suggested by Lakoff & Johnson (1980) metaphorical reasoning is a means of understanding one domain of experience in terms of another. In the above metaphorical reasoning, the elements of the PATH and JOURNEY provide the source domain which assist the conceptualisation of the abstract area of experience, DEVELOPMENT. An important case in the concept of development is not an individual but a national one, "we", the Turkish people. In this particular metaphor, mapping is done from the source domain of journey to the target domain of development.

In the following debate on *capital,* there is another example of metaphorical reasoning activated by the neophytes. In addition, this debate is an example of a *within-domain discussion* in which all reasoning takes place within the domain of economics, itself. In the previous debates, factual questions were asked in order to identify the initial mental representation of the knowledge of neophytes. In the case of *capital,* however, in addition to the factual question of what *capital* means in economics, neophytes were asked an additional one which had more explanatory power "why is electricity not considered as a capital good?". As for the initial knowledge base, all group members already have some general idea of what *capital* might mean in the economics domain.

for F650, making a **capital** gain of F50 per
Electricity is not a **capital** good because it is
the cost of a **capital** good such as typewriters
Buildings and lorries are **capital** goods because they can be
shoes, shirts or food, **capital** goods or "investment goods"
factors of labour, and **capital** to make goods and
and telecommunications companies are **capital** intensive utilities

Aston University

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From the analyses of the TAPs, it has been found that uptake of all groups was similar, as illustrated below:

From some knowledge base to full uptake: *"Capital is the economical power which you need for establishing a business. It can be money (cash), also it can be goods that you can gain money from. Capital goods can be factories, machines and industrial area that you can sell. Electricity is not a capital good because you can't buy electric as electricity. You can use it in the case of a temperature, light and energy. The second reason is you must establish dams and hydroelectric stations. So, you need more and more capital to produce electricity as a capital good".*

As stated in relation to frame theory (see Chapter 3/Section 3.2.2), and in Section 6.2.3 above, under a general frame, such as capital, it is possible to evoke various sub-frames. In this case, sub-frames activated involve *capital goods, examples of capital goods and why electricity is not a capital good.* For another group however, electricity was not considered as a capital good because:

"Electricity is not capital because it flows but the capital is fixed. Electricity is real capital but not financial capital because it is a kind of energy. When we build hospitals, roads we can use them over and over again. when we invest our money, we not only make profit, but also it provides benefit to people. Electricity is not permanent and when it is used up, we can't get any more benefit".

All groups, in this particular case, ended up in full uptake. In the debate above, there is an example of a metaphor in which the electricity from the source domain corresponds to the running water in the target domain.

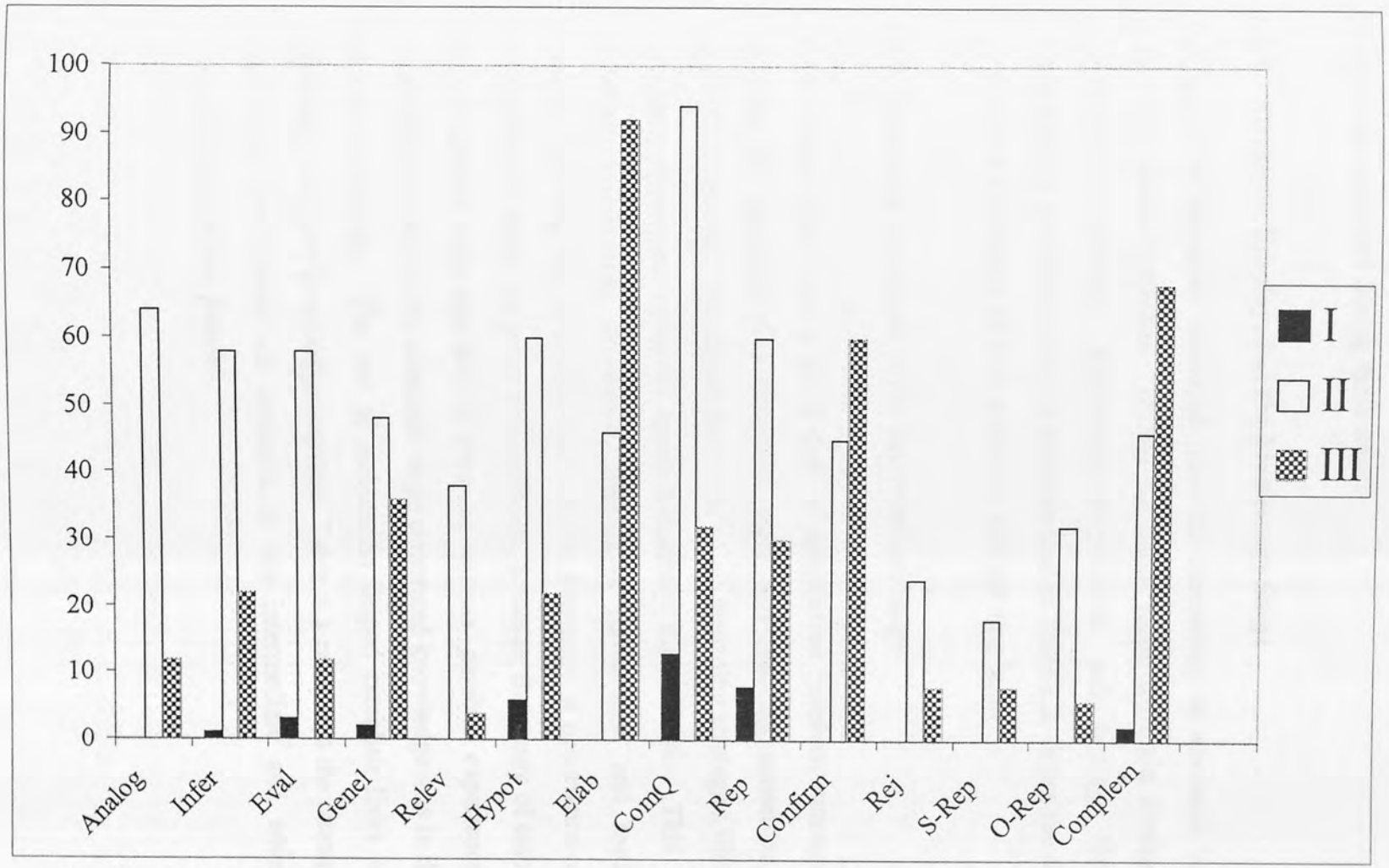
Metaphor used in conceptualising electricity confirms the results of the studies carried out by the Gentners (1982). In their research with students in their late teens, they found that the students understood electricity in terms of two metaphors, the flowing water and the moving crowd. The flowing water metaphor is particularly relevant for the present research as it bears similarity with the neophytes' reasoning process.

While the above section focused on the relationship between input, acquisition and uptake obtained through the TAPs, the following section deals with the reasoning strategies employed by the neophytes during the process of knowledge acquisition and the way in which these relate to the acquisition of domain-specific knowledge.

6.5 Strategies Employed While Acquiring Domain-specific Knowledge

The strategies employed in the acquisition process were described in Section 3.9.1 as *cognitive, metacognitive* and *interactional strategies*. Strategies in our study fall into two categories, i.e. cognitive and interactional strategies. Since metacognitive strategies occur in all the reasoning strategies employed they are not considered as a separate category. Based on the data analysis, we identified cognitive strategies as those processes which had a direct effect on the acquisition of domain-specific knowledge. Strategies in this category include analogical and metaphorical reasoning (metaphorical reasoning is not shown as a separate category but included in the analogical reasoning process, in the tables (see Tables 6.2 and 6.3) inferencing, evaluation, generalisation, relevance strategy, hypothesis formulation, hypothesis testing and elaboration. In addition, several interactional strategies were identified resulting from the collaborative nature of knowledge acquisition, which include comprehension question, reply, confirmation, reject, self and other repair and complement. We found that various cognitive strategies identified in the study by O'Malley & Chamot (1985), such as inferencing, hypothesis formulation and hypothesis testing and elaboration also exist in our categories, whereas evaluation, generalisation, relevance strategy, the analogical reasoning and metaphorical strategies could be considered as additions to the strategies identified by them.

The main purpose of identifying strategies employed by the neophytes was twofold: First, to assess their possible contribution to the acquisition process and find which particular ones promoted or accelerated acquisition, that is, the extent to which they were conducive to the acquisition process. Second, to determine the frequency of the occurrence of these strategies and identify the quantitative changes or variations in the occurrence of strategies throughout the developmental stages in knowledge acquisition. Table 6.2 illustrates percentages of occurrence of the total number of strategies during elementary to advanced stages.



I : Elementary Stage **II : Intermediate Stage** **III : Advanced Stage**

Table 6.2 The Percentage of Strategies Employed During Elementary, Intermediate and Advanced Stages

It can be seen from the table that the quantitative distribution of strategies changes during the acquisition process. The following section deals in detail with changes that occur in the nature of strategies employed during these stages.

6.5.1 Strategies Employed at the Elementary Stage

The nature of strategies employed from the elementary to advanced stages to knowledge acquisition showed variation. During the initial stage, the main strategies employed were comprehension question, hypothesis formulation and testing, reply, generalisation, complementing and inferencing, as demonstrated in Table 6.2. Since the duration of this stage was short the occurrence of such strategies was not very high.

6.5.2 Strategies Employed at the Intermediate Stage

At this stage, there was a good deal of negotiation involved amongst the neophytes in resolving the meaning of a particular word and reaching consensus in the knowledge construction process. Neophytes made use of all reasoning strategies illustrated in Table 6.3. Yet, some strategies occurred more frequently than others. This includes analogical reasoning, inferencing, evaluation, hypothesis formulation and testing, comprehension question, rejecting, etc. in comparison with the frequency of occurrence of the same strategies at the advanced stage. In terms of elaboration, however, the nature of elaborated knowledge at the intermediate stage was derived from the learners' personal experiences and general world knowledge, whereas at the advanced stage elaborated knowledge was in the nature of domain-specific knowledge. The use of elaboration helped establish links between the existing knowledge and new knowledge acquired. Table 6.3 compares the changes that take place in neophytes's employment of strategies at the intermediate and advanced stages in the knowledge acquisition process.

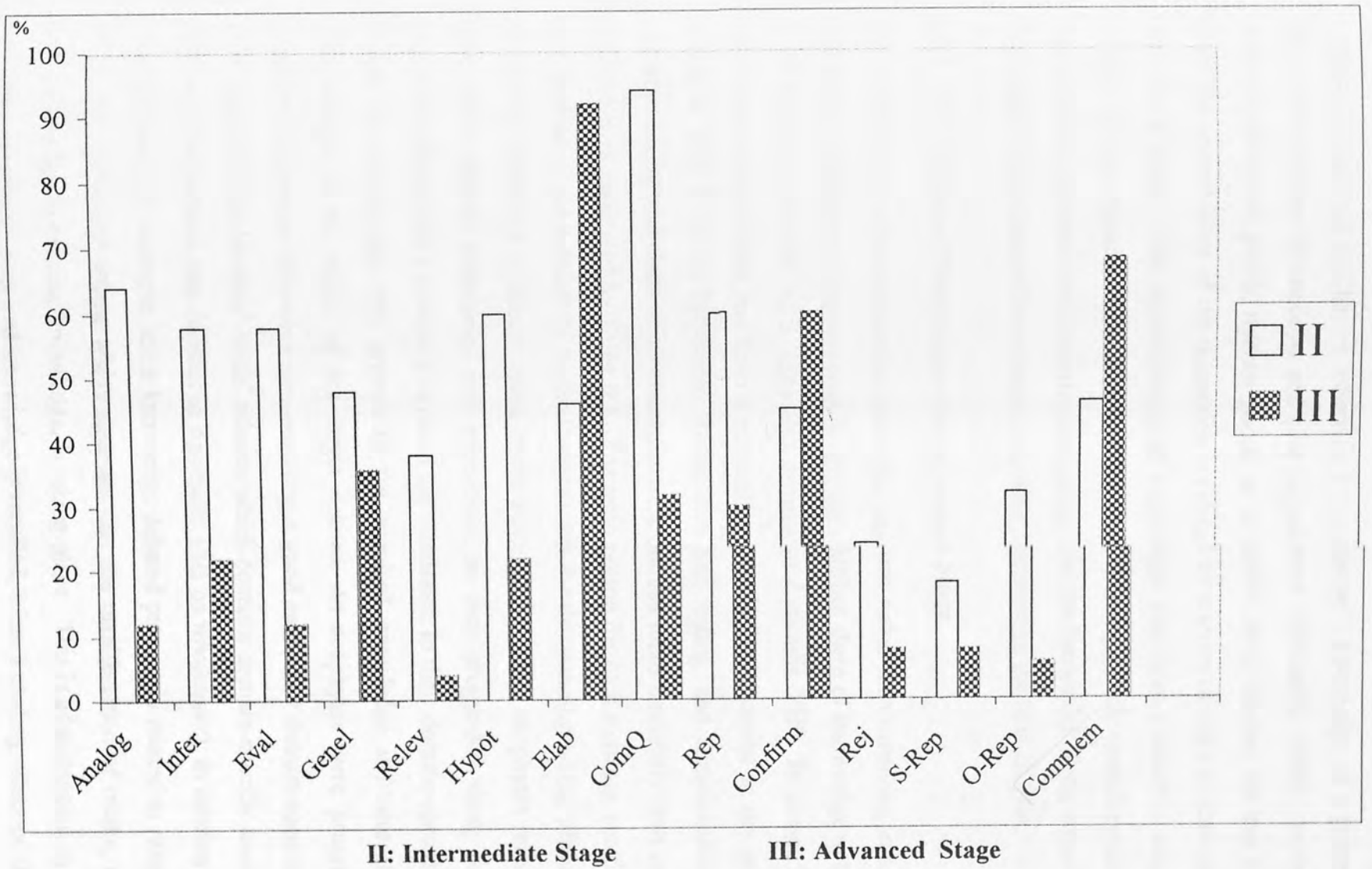


Table 6.3 Comparison of Strategies Employed During Intermediate and Advanced Stages

Appendix IX shows a sample debate on *purchase* where a good deal of negotiation is involved. As stated in Chapter 3/Section 3.1, a learner's knowledge of a given word brings with it associations of concepts and past experiences (McCarthy, 1990). In the debates on *domestic, substitute goods, inferior goods*, as in several other debates, the key concept which forms the central point of the discussion is related by a series of links to knowledge gathered over many years. This accumulation of knowledge was more evident in adults, as in the context of our research with several years of schooling. Such encyclopeadic knowledge provided links between one's existing knowledge and the knowledge being acquired leading to meaningful acquisition of knowledge, as will be discussed in the next chapter.

6.5.3 The Nature of Strategies at the Advanced Stage

The main feature of the debates at this stage was that rather than involving in a good deal of negotiation process each learner contributed with his/her share of knowledge to the discussion as illustrated in Section 6.2.3. (See also debates in Appendix VIII). In comparison with the intermediate stage, there has been a noticeable quantitative variation in the employment of strategies with a fall in hypothesis formulation and testing, and comprehension questions. Complementing and elaboration strategies were utilised more frequently than comprehension check, etc. as illustrated by Table 6.3. The main reason for such a change could be attributed to a decline in the amount of explicit negotiation for the meaning taking place amongst the neophytes. Whereas at earlier stages in the acquisition process neophytes relied exclusively upon prior general knowledge and experience, as they progressed along the acquisition continuum, there was a tendency to relate the discussion to their domain-specific knowledge. It can be argued that this growth in the acquired knowledge indicates the degree of enculturation to the values of the target culture. As neophytes were progressing in the enculturation process they were also acquiring a good amount of domain-specific knowledge, as is clear from the learners' initial schema which contains domain-specific knowledge of the concept to be debated (see debates in Appendix VIII on *wholesaler*). In relation to the debate on *wholesaler,* for example, some knowledge debated previously related to *retailer*, crops up during this particular debate which suggests that the manifestation of intake, integration of new knowledge to existing knowledge, is taking place. This is advantageous in that it shows that when previously acquired knowledge is recalled, it has a cycling effect on the acquisition

process. It can be concluded that enculturation (defined in Section 4.2) has made acquisition of knowledge easier from the individual point of view as it decreased the need for explicit negotiation and increased the chances of contribution. These findings are illustrated in the following debates.

Excerpt 15: *GNP*

When asked what they knew about GNP, groups started formulating various hypotheses about it, for example, "General National Policy", while another group stated that it could mean "Gross National Product" or provided the Turkish equivalent of it as "in Turkish it means GSMH". Therefore, various assumptions were made at the initial stage of the acquisition process. The abbreviation GNP was thus conceptualised peripherally and more evidence was searched from the concordances, as illustrated below:

According to the economists "GNP measures total income earned by domestic citizens and GNP is the total product of the nation". (Wonnacott & Wonnacott, 1986)

The debate on GNP points to several important features. During the debate, first, Tugbay recalls the faculty lecturer's estimation of GNP from the lecture attended and he integrates it into the discussion. In terms of code-switching, it is interesting to note that the definition of GNP is provided by Tugbay in L2. It can be assumed that GNP was learnt together with its definition. A cultural frame of reference is also activated at several points in the discussion. (See Section 6.6 a detailed explanation on the cultural frame of reference). The first reference is made to Sweden by Okan that GNP is very high there. The second reference is made to China and Japan as two countries taking a tighter control on population growth. The final reference is made to European countries particularly to Germany where the opposite situation is being encouraged by the government. The uptake of this debate shows parallelism between what is debated and what is acquired.

The initial uptake of the above group is: *"Every government has a budget during one year and the government collects some income like taxes on roads, bridges etc. from people. Then, this income is spent for some necessities on roads, hospitals, schools. After all this spending the rest of the money is Gross National Product. If we divide this money equally by the population this is called the national income. If the Gross National Product increases in a country then the economy in that country will be improving. GNP is measured in dollars".*

In fact, what they had acquired from their visit to DECOBA is reflected in their output. For another group, GNP was further conceptualised as: "It means, division of total money in the treasury to the national population and one person's share gives us GNP. Every year GNP is estimated and it shows the economic welfare of the nation".

There was not much of a difference in the conceptualisation of this concept by the other neophytes. To another group members, GNP refers to: "National income. If the real GNP increases then the economy grows. It is divided by the population". Yet, for another group GNP is briefly described as "income per person".

Broker was the last key word debated in the enculturation period.

Excerpt 16: *Broker*

The most interesting feature of the final debate was that all group members ended the debate with the same level of knowledge with no negotiation taking place among themselves but each making their own share of contribution. What is more, the debate reflects an exchange of existing knowledge, rather than acquisition of any more new domain-specific knowledge.

Okan, Levent and Adil discussing *broker*

Broker refers to "an intermediary in a financial market" (Wonnacott & Wonnacott, 1986).

It was stated in Section 3.7.2 that neophytes, at the initial stages of enculturation, are not expected to have the shared frame of reference to understand domain-specific knowledge. However, with more exposure to enculturation and involvement in the discussions on the basis of the L2 input, the larger the shared domain-specific frame of reference is expected to be. The greater the domain-specific frame of reference, the less the need for explicit negotiation, that is, the more facts the individuals share in relation to domain-specific knowledge, the less they need to negotiate for the meaning. These views have been proved by the findings of the present research. As argued in the preceding section, during the advanced stage, there was a decrease in explicit communication for the meaning. Debates were also getting longer as neophytes did a lot of elaboration adding what they knew about Turkey or linking it to other concepts already discussed.

It has been stated previously that the main source of input for acquiring domain-specific knowledge in the TDC is the textbook which is imported from America or England with a foreign authorship and originally foreign readership addressee, too. As explained in the introductory pages of those books, they are written for an American or British readership, which suggest that they are not originally intended for a foreign such as a Turkish readership in mind. Thus, the cultural values reflected in them are unavoidable. The section below focuses on the cultural reflections of neophytes during acquisition of domain-specific knowledge.

6.6 Cultural Awareness in Knowledge Acquisition

Despite the fact that certain concepts of economics like demand, supply, barter, price mechanisms do have validity in the economic system of other countries, particularly Turkey, the economic systems related to these concepts carry the cultural elements since all examples and illustrations are based upon a British or an American culture. It has also been stated in relation to schemata, frames and scripts that they carry cultural elements. The discussion involved in various debates revealed the neophytes' awareness of the cultural elements involved in the target discourse of economics. They tended to interpret information against the background of their own culture. The following debate illustrates the cultural frame of reference(s), (hereafter CFR), evoked and debated.

Excerpt 17: Cultural elements in *Labour*

people are in the **labour** force and are unemployed.
France's unit **labour** costs are lower, too.
working population is the **labour** force plus those in
in the 1970s the government tried to reduce the **labour** force
move out of the **labour** force. In Sweden it
were in the UK **labour** force. Similar patterns are
coming back into the **labour** force in search of

Nacide, Orcun and Ayse discussing *labour*

The debate starts with Nacide's defining what *labour* means. Okan, however, brings in his CFR in relation to France's cost of labour which he then compares with the Turkish cost of labour being the lowest and illustrates it with an example that Mercedes are produced in Turkey due to the low cost of labour. This illustration is further elaborated with the Germany example where the cost of labour is much higher. The second cultural element involved was in relation to the last concordance line. This time, it is Ayse, the third interlocutor, who drew attention to the fact that it was not the Turkish government that reduced the labour force but some other governments, interpreting it against the background of her own culture.

Another important cultural element that was brought to the learners'attention was related to the concept of *unemployment benefit*. While discussing *the benefit*, they were aware that unlike social benefit which is part of the Turkish culture, *unemployment benefit* does not exist in the Turkish culture, yet, it is pointed out by the neophytes that *social benefit* does exist in the Turkish culture and they gave *the child benefit* the families get as an example of the social benefit. As for the unemployment benefit, the group members discuss what unemployment benefit is and they also state that such a benefit does not exist in the Turkish economic system (see Appendix X for the debates on benefit and *unemployment benefit*).

In Section 6.2.1, it was stated that a methodological framework (see Figure 6.1) was adopted in order to initiate the knowledge acquisition process. Having completed the research and presented the data, we will now put forward an argument to justify the model followed.

6.7 Justification of the Framework of Research Adopted for Observing Processes

This section attempts to offer a justification for the steps followed in the framework (Figure 6.1), which is used to observe the growth process of *seeds* from a dynamic perspective. The methodological framework enabled us to demonstrate convincingly step by step developments and growth of knowledge acquisition from the very initial to the very final stage empirically. In this way, it has been possible to offer an answer to the second research question posed in Chapter 1 which asks "how can one best arrange to make visible what is going on in the learners' minds?, from a *dynamic perspective*.

In addition to offering answer to the above research question, this chapter illustrated the possibility of establishing favourable conditions at the language centre under which acquisition of domain-specific knowledge could be facilitated by the prospective members of DECOBA. The section below attempts to justify each component in the methodological framework utilised.

Initial knowledge: To determine individuals' mental representation of knowledge about a given concept, a series of factual questions were asked which required neophytes to respond by writing in L2. We assume that neophytes used whatever relevant conceptual knowledge they had, to create a mental representation of a particular concept that allowed them to answer our question, before starting the TAPs. Asking neophytes to write down what they knew or directing them to some questions related to the concept to be discussed increased their awareness of their current knowledge, gave them a purpose for the task at hand and increased their expectation towards the domain-specific nature of the discussion. As confirmed by Bransford et al., (1986) what one knows is essential and without this awareness the knowledge remains relatively inert.

Acquisition of knowledge: The data concerning the cognitive processes underlying the acquisition process was obtained through the TAPs, since this was considered to be practically one of the most appropriate methods of gaining access to the actual mental processes, as discussed in the methodology section of the research. In the present research, neophytes were given an opportunity to discuss, share each other's opinion, and collaboratively construct knowledge of the target discipline. Each debate took place in Turkish with some code-switching involved. Allowing the neophytes to have debates in L1 enabled them to express more clearly what they had comprehended from the input given as effectively as possible. It is worth referring to acquisition taking place in L1 and L2, as evidenced from the code-switching, which happened frequently during the debates. Code-switching has shown that acquisition of domain-specific knowledge was taking place in L1, as well as in L2. Although the main objective of our research was related to the acquisition of domain-specific knowledge via L2, it can be assumed that part of the knowledge was acquired in L1. Whenever there was some initial knowledge available in learners' schemata, this was acquired as being a member

of the Turkish community from school and/or from their exposure to media, etc. In addition, retrospective data obtained from the neophytes following each debate, which was in L2, also shows that acquisition took place via L2. In this respect, it can be argued that there was a good balance in terms of acquisition of domain-specific knowledge taking place in both languages. It can also be argued that the use of L1 helped to access an already existing knowledge and accelerated acquisition of knowledge in L2.

Our research has also demonstrated that by acquiring economics knowledge neophytes can improve their linguistic competence in L2 as well, as proved by the growing knowledge demonstrated in terms of the difference between the final and the initial uptake of learners. It is clear from the final uptake produced by the neophytes in English after the TAPs that neophytes have improved their English in addition to acquiring domain-specific knowledge. Though debates were held in L1, it can be argued with convincing evidence that concept and language development in L2 have occurred together.

Initial Uptake: As stated earlier in Section 3.8, determining acquisition has been a difficult process. To counterbalance the possible shortcomings of TAPs, neophytes were asked to write down, in retrospect, what they had acquired in L2. This way of finding out what was acquired indicated if debates held in L1 led to the acquisition process in L2 or not.

Final Uptake: In order to examine whether neophytes' responses were consistent with respect to *shared understanding,* they were allowed to compare their own understanding of a particular concept with that of the expert members of the TDC. In this way, they had the whole responsibility for the acquisition process without any outside interference. This method gave the learners a chance to overcome any possible misunderstanding that might exist in their understanding of a particular concept. The whole procedure allowed identifying representations of mental knowledge and how this knowledge has evolved or changed, ending in conceptual reorganisation of the learners' initial schema or knowledge base.

A further factor which had a facilitating effect on the acquisition of knowledge could well be attributed to the order in which the concordance lines of the concepts were presented (see Chapter 4 for details). The fact that concepts were presented in order of difficulty from

relatively simpler to more complex ones, helped lower the occurrence of tension amongst the learners. For example, the concept *scarcity*, which was introduced to neophytes during the earlier weeks of the research, was relatively less complex in comparison with *fiscal*, which was introduced towards the end of the enculturation.

6.8 Advantages of Utilising Think Aloud Protocols For Analysing Cognitive Processes

Since TAPs were used for analysing cognitive processes involved in knowledge acquisition, it is important to discuss their pedagogical advantages concerning this purpose. The sharing perspective of knowledge acquisition was highlighted in relation to the modes of acquisition in Section 3.7. It was argued that acquisition of knowledge could be promoted when it is collaboratively negotiated among the prospective members of a community, based on the constructivist theory. Working in groups of three towards a common goal of acquiring domain-specific knowledge had a large pedagogical potential, as in the working in pairs of House (1988) in translation studies. The section below explains the advantages gained from such collaboration by the neophytes.

Incidental learning: Part of the knowledge acquired displayed incidental learning which has come as a by-product of explicit negotiation. Incidental learning is defined as "picking up target language forms from input when they do not carry information crucial to the task" (Schmidt, 1990:149). Neophytes, as reflected in the post interview we held with them, stated that in some cases they picked up knowledge not only from the input, but also through the interaction with their interlocutors. Here is one of the reports from the neophytes: "I confused purse with purchase but now I know that they refer to different things". It can be argued that collaboration has led to the negotiation process which helped learners to reach a consensus on the meaning and provided a *trigger* for activating existing knowledge; certain interactional strategies (see Section 6.5 for a discussion) were of great benefit in many ways.

In the present research we found out that neophytes' attention rested on meaning, whereas their attention to language forms has been of a peripheral nature. On the basis of the repeated encounters of similar stimuli on the concordance lines they gradually developed an implicit

knowledge of a number of language forms as well as of the corresponding meanings and functions.

Accelerating domain-specific knowledge: Collaborative construction of meaning provided the learners with an opportunity to try out hypotheses in collaboration with other neophytes to see if they work and reformulate other hypotheses. Since teacher interference impedes learners' natural knowledge development, as the researcher and the teacher of this study we decided to remain quiet and not interfere with the natural process of acquisition. It can be concluded that knowledge acquisition has accelerated as a result of the joint, collaborative effort of each group of neophytes.

Taking ownership for the learning process: Neophytes were autonomous and took the primary responsibility for carrying out their own learning, they did not seek specific assistance from us, but relied on their own resources. Thus, by taking ownership of their own learning process, they became independent and collaborative. This idea has also been supported by the proponents of the constructivist theory in relation to learning scientific knowledge that learners should be provided with some ownership in the development of concepts (Gergen, 1982; Callison, 1991).

Accountability for their own learning: In each debate, learners were responsible for their own learning which resulted in their becoming *accountable* for what they acquired. Thus, such a method of acquisition altered the need from dependence on an instructor to becoming increasingly able to foster their own learning process. Related to the accountability is the notion of dynamism generated. Unlike traditional learning where the teacher is in the position of transmitting knowledge, which, as stated in section 3.4.2, is heavily criticised by the constructivist view to acquisition as leading to a passive learning environment, collaborative learning has generated a dynamic process in relation to knowledge acquisition, as it has been more challenging and increased student involvement.

A spirit of group dynamism: The group in our case consisted of three members who are united in the pursuit of a common goal; reaching shared understanding and aiming at the same

frame of reference, by means of communicating, each contributing with his/her share of knowledge. The strength of the relationship, that is, "group cohesiveness" (Donelson, 1990), linking members to one another and to the group itself was largely derived from the homogeneity of the group due to the fact that each group member belonged to the same TDC. The homogeneity in the formation of the *replica community* was an advantage in this investigation. Another important factor which resulted in the acquisition as a result of negotiation of meaning was "the low affective filter", that is, "the affective side of the learner controlling whether the input becomes intake" (Ellis, 1990). This was also ensured by the homogeneity of the classroom which increased neophytes' motivation, involvement and interest displayed in acquiring concepts of their specific domain as a preparation for their future academic studies.

Co-operative learning environment: The classroom at YADIM which was formed as a *replica community* was structured to promote a co-operative environment. The empirical evidence increasingly ranks co-operative classrooms over individualistic classrooms as "co-operation is more effective than individualistic effort" (Klein, 1956: 12), as supported by the constructivists. One variable that is consistently stressed more than others is the *interpersonal learning dimension* of interaction among group members. Within a group, each member represented a dimension of possible entry point for knowledge which was taken up by other members, elaborated, extended and sometimes turned down as being irrelevant for that situation. Group members thus constituted *multi-dimensional entry points* to knowledge acquisition. Thus, a co-operative learning environment has been an important feature of the acquisition process.

6.9 Determining the Product of Knowledge Acquisition

Although our major aim was to observe *the processes* taking place during knowledge acquisition, we also investigated the *product* dimension to knowledge acquisition through the written recall protocols. In addition, the data obtained from the questionnaires, diaries and examinations provided useful information concerning affective and cognitive aspects of knowledge acquisition through what the students produced in these written documents. In the following section, we present data obtained from these sources respectively.

6.9.1 Data from the Written Recall Protocols - A Static View Knowledge Acquisition

15 enculturated learners (EG) and those of their corresponding 15 non-enculturated learners who had received no enculturation studies (NG) were selected for a closer examination to describe the impact of the enculturation process in neophytes' ability in accessing domain-specific knowledge during the post-enculturation stage of our study. In order to determine the acquisition process among students at different levels of proficiency and make the research findings more generalisable (Lee, 1986), we decided to examine representative samples in different levels of language proficiency by classifying participants in both groups into three levels of proficiency: low, mid and high-proficiency according to what they scored in the exemption test administered at the end of the year at YADIM. [5]

The selected texts for the protocols were from the first year reading programme at DECOBA, expected to be read by the students during that particular week of implementation of our research. Each text was on a different topic such as "economics system, business organisation, human relations, etc. It is not the purpose of the present research to go into genre characteristics.

As stated in Chapter 3, the product of what has been acquired would also be planned around a particular task and three components of tasks were suggested for this purpose, *as input, purpose and uptake*. It was also stated that the framework developed for determining the product dimension of knowledge acquisition need not have to be as extensive as the one developed for tracing the processes. Taking this into account, the students were given the following task:

Both groups, namely EG and NG, came together at the same time during the same week and all were required to read the same text (the input component of the task), of which a written protocol was required. A total of five reading texts for producing the recall protocols were

[5] In Section 6.1, *product* was used to refer to neophytes' written initial and final uptakes as well as what they discussed. In this section, however, the *product* is used to refer to what learners produced as a result of their written recall protocols, as a kind of final stage, and refers to a *static* aspect, i.e. only the product in the sense of a text was considered

used. They were given the following instruction, which corresponds to *the purpose* component of the task:

Read the text carefully. Imagine that you are explaining what you have read to one of your lecturers in the examination. Write down all you remember from the passage. Be sure to be clear and organised in your writing.

The above instruction corresponds to learners' real world tasks since in their department they have to read in order to be able to prepare some tasks and *writing* in the above instruction corresponds to *the product* component of the task. After reading each text, the participants were given a chance to look over the text again so that they might have a second opportunity to read and reassemble a complete and a coherent version. They were not allowed to refer to the text during writing the protocol, as in the experimental research of Kintsch & van Dijk (1978). Following the reading task, the texts were collected before the students started on their written recall protocols. Each student was given a blank sheet to record their recalls. The reading time was limited for each text but for writing no limit was given. They were required to write as much as they could remember.

After the students read specialised written genres of economics in English, the product of their acquisition, that is, the amount of information understood and retained was analysed, based on the idea units, similar to the analysis used by researchers mentioned in Chapter 3. In the analysis of the protocols, "barter is an exchange system", is considered as conveying a complete idea unit. In order to obtain an objective assessment of protocols a hierarchical schematic map of each text was drawn similar to Meyer (1995) illustrating idea units of each text, against which each student's recalled idea, that is, the product of what they acquired could be compared.

The map provided explicit accounts of superordinate or macro and subordinate or micro ideas and the relationships among these different ideas. The method was chosen because findings of other researchers had confirmed its validity (Alexander & Blockmiller, 1982; Carrell, 1984; Swaffer, 1988; Sadoski et al., 1995; Meyer, 1995). Each individual's recalled number of idea units was counted and compared against the number of idea units on the map. As a next stage, the average percentage of idea units recalled for each proficiency group was calculated.

Recall protocols were analysed independently, by us and another colleague who was also a lecturer and was familiar with such an analysis. 75% of the data were randomly selected for assessing interrater reliability. The proportion of agreement was 92%.

Protocols, forming the summarised version of the texts were scored from two aspects; quantitatively, that is, calculating the total number of idea units recalled; and qualitatively involving the accuracy, completeness and the type of modification made to the original text as displayed in the protocols by the learners.

6.9.1.1 Quantitative Analysis

Protocols were analysed in terms of the macro idea units, the major ideas and micro idea units, the minor ideas, identified from the prose analysis for each of the texts and the responses have been classified according to the two groups of learners and were displayed in Tables 6.4 and 6.5.

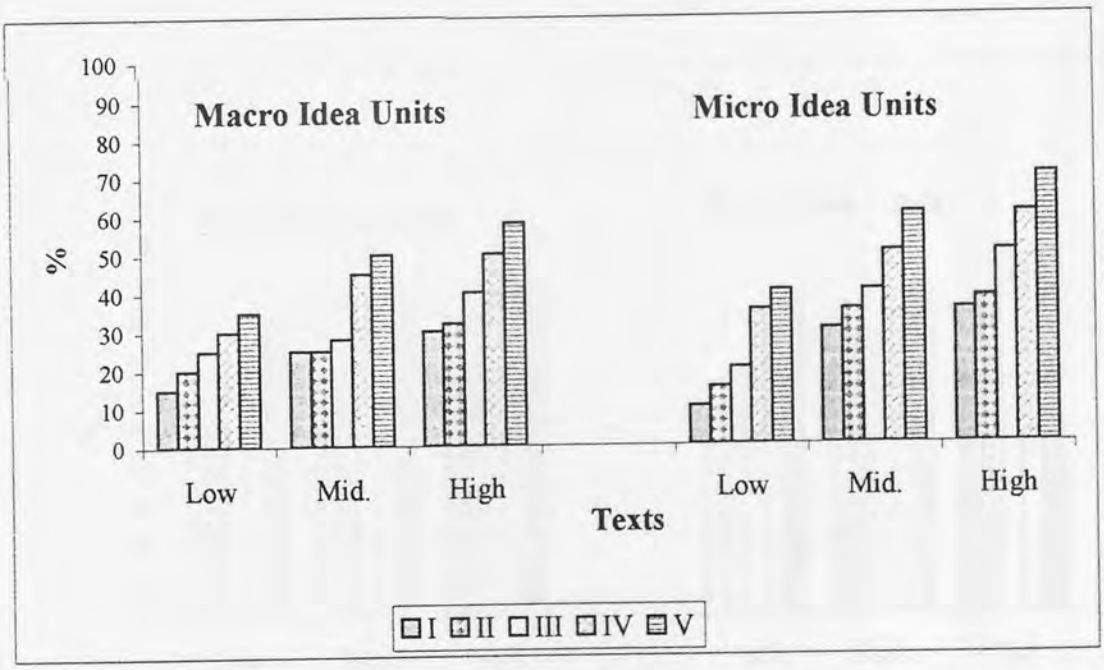


Table 6.4 Percentages of the Average Number of Macro and Micro Idea Units Recalled by the NG

Table 6.4 illustrates the percentage of the average number of macro and micro idea units recalled by the three language proficiency groups in the NG. The first noticeable feature to be seen in the table is the difference in the percentage of average idea units recalled according to the learners' general level of proficiency. That is, the percentage of average idea units recalled

accurately by the low proficiency students is lower compared with the mid-proficiency learners, while the percentage of average idea units recalled by the mid and high-proficiency learners tends to be the highest. This points to the fact that the level of proficiency in general English is an important variable in the acquisition and processing of domain-related specialist texts.

A second noticeable feature is a progressive increase in the percentage of average idea units recalled between groups. That is, the percentage of idea units recalled by the three groups increases gradually during the course of the academic year. For example, for the high-proficiency students in the NG, the percentage of average idea units recalled, at micro level, for text 1 is 35% whereas for text 3 this is 50% and it reaches its highest value for the final text recalled with 70%. This can be related to the fact that learners were gradually building up domain-specific knowledge and were becoming more familiar and knowledgeable in comprehending domain-related specialist texts during the course of the academic year.

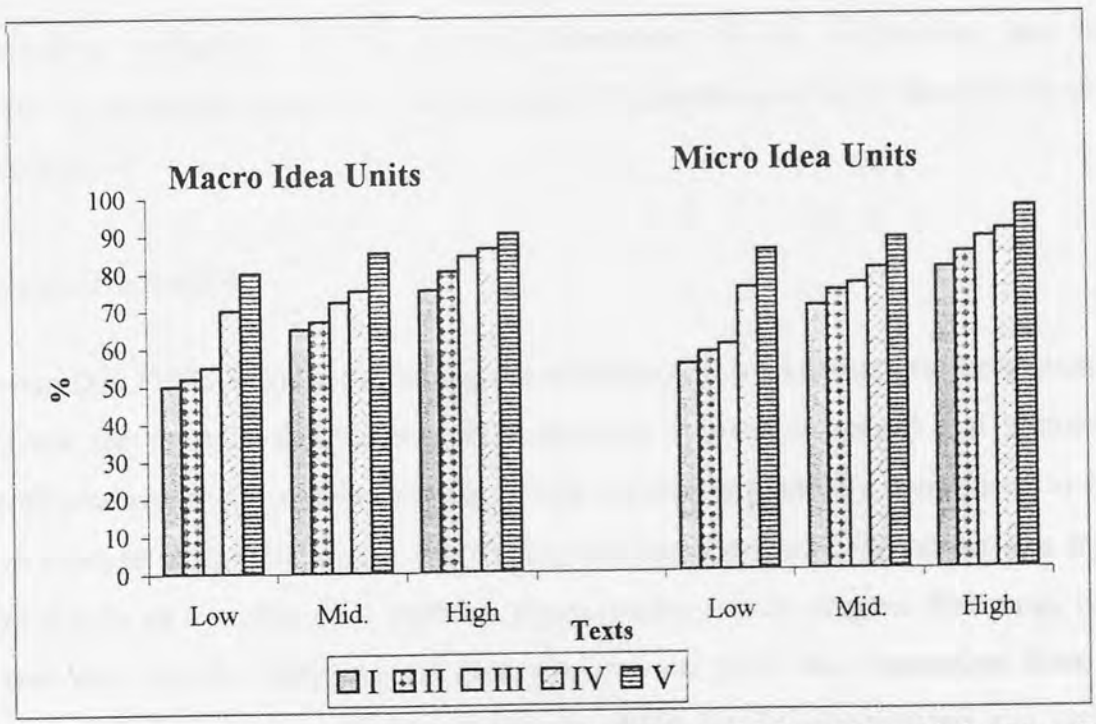


Table 6.5 Percentages of the Average Number of Macro and Micro Idea Units Recalled by the EG

Table 6.5 illustrates the percentage of average number of idea units by students in the EG on five recall tasks. As explained earlier, unlike the NG this group had received enculturation while attending YADIM, as a result of which they had acquired domain-specific knowledge. The most significant difference between the two groups can be accounted for in terms of the number of idea units recalled. As the tables 6.4 and 6.5 illustrate, the percentage of average idea units recalled for high, mid and low-proficiency students both at macro and micro levels is significantly higher in the EG group than for their counterparts in the NG group. What is more noteworthy is that even the low proficiency learners in the EG scored higher than those high-proficiency ones in the NG group. It seems that learners in the EG showed evidence of the benefit of the enculturation as reflected in their recalled output. The findings obtained from the protocol analysis confirm the previous research which demonstrated that readers who are familiar with the content of the text in L2, understand and accurately recall more than the readers less familiar with the text content (Johnson 1982; Steffenson et al., 1984) and also perform better on written recalls (Floyd & Carrell, 1987).

This quantitative evaluation of the product dimension of the acquisition has been complemented by a qualitative analysis which gives information in terms of the content of the information recalled.

6.9.1.2 Qualitative Analysis

Kintsch & van Dijk (1978:375), in describing the recall protocols state that protocols obtained in experiments are texts in their own right, satisfying in general textual and contextual conditions of production and communication. Since reading is generally considered to be a constructive process, it can be argued that during the recall protocol the reader can try to produce not simply as a replica of a memory representation of the original discourse, but a new text that may contain information based not only on what they remember from the original text, but also consisting of reconstructively added details, explanations and various other features.

The analysis of the protocols demonstrated three types of modifications namely, *elaboration, distortion and reconstruction,* which were also identified in the study of Kintsch & van Dijk

(1978), compared to the original texts. Each of these transformations is illustrated on the text entitled "barter versus exchange". Each transformation will be described briefly below and an example for each one will be provided.

Elaborations: As defined in Section 3.9.1, elaboration refers to readers making details that are consistent with the original text in order to supplement the textual information. In the present research, there was evidence that learners in the EG who had experienced enculturation produced more consistent ideas that were not mentioned in the text but were consistent with its content. Thus, such idea units were scored as *elaboration* in the protocols. Below is part of the original text and elaboration based on it.

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From the recall protocol, it seems that the availability of a domain-specific frame of reference or a schema provided a framework which helped new knowledge to be accessed more easily. As stated in Chapter 3, according to Ausubel (1963, 1968) a schema provides a framework or a structure for hierarchical organisation of ideas. Relevant schemata, when activated, have been found particularly useful as frameworks for incorporating new information, to which new knowledge entries can be connected. The cognitive structure thus served as a "principal factor" (Ausubel,1963:217) for retention of meaningful new material. The findings confirm the statement made by Anderson & Pearson (1988:5) that important text information fits into places called "slots" or "layers" (Nystrand, 1986) and such information can be learned readily. As also confirmed by Cooper & Petrosky (1976:8), "the extent to which the information can be learned, can be meaningful and is determined by both the amount and the quality of prior knowledge". Appendix XI-a includes more sample elaborations.

Distortions in written recalls: We consider distortion in the recall protocols of learners as evidence of the deviation from the text's idea units that is inconsistent with it and/or learners' misinterpretation of the textual information. In our research, distortions which were mostly found in the protocols of the NG, resulted for one of the following reasons:

a) Due to gaps in students' knowledge of the specialist domain or any degree of misreading of the text. When the reader's frame of reference was inconsistent with that of the author, the student tended to make more distortions. Distorted idea units carried semantic elements that contradicted the information given in the text, producing a completely wrong meaning, as illustrated by the underlined section of the idea unit in the following example:

"While using the barter system, <u>money has some functions</u>".
According to the text money is non-existent in the bartering system. This suggests that the reader was not able to call upon the relevant schema and this type of distortion led to an alteration of the explicit textual information.

b) The second type of distortion involved lexical misinterpretation distorting the message itself, as in the example, below:

The original text says "but we can take it for granted".

Distorted outcome: *"Barter is a kind of selling and buying system. We can say barter means money's granted"*.

In this example, the reader seems to be struggling with the local level of difficulties. Appendix XI-b shows examples of distortions in the protocols of NG and one example which shows how one mid-proficiency learner from the EG clearly elaborates on the concept of *double coincidence* by providing a coherent interpretation of a text in his recall protocol. Though elaboration and distortion can be considered as an integral part of the normal comprehension processes, as stated by Steffenson & Joag-Dev (1984), in the present study we discovered that the acquisition of knowledge from texts was constantly held up by the lack of domain-specific knowledge.

Reconstructions: Reconstruction deals with the readers' attempts to reconstruct the content using different words but with the same sense. Reconstruction was often used in the protocols of the EG. Below is part of a protocol produced by a student in the EG on the text *barter versus monetary exchange* in which reconstructions are underlined.

	TEXT 1			TEXT 2			TEXT 3			TEXT 4			TEXT 5		
	Elab	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*
Low	0	3	0	0	3	2	2	3	5	2	3	6	3	2	8
Mid	0	2	6	2	3	6	3	0	8	4	0	12	5	0	16
High	2	2	8	5	0	12	6	0	15	6	0	18	7	0	22

Table 6.6 Transformations Performed by the NG

	TEXT 1			TEXT 2			TEXT 3			TEXT 4			TEXT 5		
	Elab	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*	*Elab*	*Dis*	*Res*
Low	5	2	15	8	1	20	8	0	25	10	0	30	12	0	32
Mid	8	1	18	10	0	20	15	0	30	20	0	35	20	0	38
High	15	0	30	20	0	33	25	0	40	28	0	42	30	0	48

Table 6.7 Transformations Performed by the EG

Table 6.6 shows the average number of transformations performed by learners in different proficiency groups in the NG, whereas Table 6.7 illustrates the same type of transformations performed by the EG. As is clear from Table 6.7, the occurrence of the average number of elaboration and reconstruction is higher by all the group members in the EG compared with their counterparts in the NG group. Learners in the mid and high proficiency groups seemed to be more skilful in linking ideas with each other, due to the prior domain-specific knowledge, and experienced only a few lexical problems, as is clear from the quantity and quality of the idea units produced in their protocols. Only a few cases of the distorted ideas were recorded by the low proficiency students in this group during the first two texts.
As demonstrated above, the texts or representation of meaning that the readers created in both groups were different in both quantity - the amount of information they contained - and quality - the kind of information they contained. The factors accounting for the differences between the protocols of both groups will be discussed in Chapter 7.

The previous section presented the data obtained from the recall protocols, which determined the *product* of knowledge acquired. The written recall protocols also investigated the extent to which neophytes were initiated and became effective members of their TDC. It gave us encouraging and positive results in preparing neophytes more efficiently for their TDC.

In the following section, we present the data obtained from the evaluation form and diaries which reflect the neophytes' experiences of the enculturation studies. These will be followed by illustrating the data obtained from the examination results.

6.9.2 Data Obtained from the Questionnaires

It was stated in Section 3.8.3 that evaluation constitutes an important part of a learning process and course planning and two methods of evaluations, i.e. formative and summative evaluation were discussed in ELT literature (Dubin & Olshtain, 1986; Richards, 1990). At the end of the enculturation, a summative evaluation was obtained by asking the neophytes to complete an evaluation form consisting of 10 questions, on which they could express their overall reactions to the study. (See Appendix XII for the evaluation form). The evaluation forms were answered in L1, and we afterwards translated them into L2. In the following section, the summary of the neophytes' responses to the questions on the evaluation form is given.

Neophytes who responded to the questionnaire all said that they found the enculturation studies useful. Their general opinion of the studies carried out at YADIM during the course of this particular study is summarised as follows:

As regards the most important problems they had encountered during these studies, both groups stated that at first, they found such studies difficult and boring, having to learn a lot of economics concepts. This was due to their lack of vocabulary and unfamiliarity with the subjects. However, they admitted that during the course of time, they began to enjoy it. The second source of difficulty was related to the concordance lines. They pointed out that at first they found some concordance lines unhelpful and difficult to figure out what they meant but in the course of time they were able to make more sense of them. Neophytes stated that they found the discussions (TAPs) useful in exchanging their views with their friends and becoming familiarised with the concepts of their discipline while they were at YADIM.

The general opinion expressed on the lectures they attended at DECOBA was considered as a good investment for the following year. They stated that they found the idea of participating in the lectures necessary and useful, as illustrated below:

Yet, they mentioned that at the initial stages of participating in the lectures they could not understand much, but in the course of time they were able to overcome their difficulties. As for the contribution the studies at YADIM had made to their understanding of the lectures it was stated by the members of both groups that studies at YADIM have made a positive contribution because the subjects in their department were just an extension of what they had been learning at YADIM. They pointed out that studies at YADIM increased their lexical knowledge, familiarised them with knowledge of their discipline and all these helped them to understand the lectures much better.

Since one of the major purposes of our research was to prepare the neophytes for the WER in the faculty, they were asked how they had evaluated themselves in comprehending the specialist texts. The summary of what the students stated is provided below:

Through the questionnaire, they offered their recommendation for the future state of YADIM's programme, stating that this was a very good method and thus this programme should continue and be supported in future years. They were aware that students who complete YADIM, without any exposure to enculturation studies were having a lot of difficulties in their departments. Therefore, they suggested that more time be allocated to subject specific education. A further recommendation put forward by the students was related to applying similar programmes in subsequent years, to students specialising in other subjects, thus not restricting this application to this group only and arranging classes according to the students field of specialism, as in this particular study.

From the analyses of the evaluation forms, it is evident that enculturation studies provided a good bridge between the activities at YADIM and those of the TDC, as intended by the present research. The discussion concerning the evaluation form will be given in Chapter 7.

In addition to the use of evaluation forms, further evidence to support the enculturation process was obtained by means of diaries and occasional interviews held with neophytes. The following section presents analyses of diary results.

6.9.3 Data From the Diaries

Neophytes were asked to reflect on their personal experiences of the enculturation process by keeping diaries while they were at YADIM as well as at DECOBA. Diaries were collected and each diary entry was examined for prominent patterns; frequency counts were made on items that frequently emerged from the diary entries, as in many studies conducted by Long (1980); Nunan (1989) and Herguner (1995). This section presents reflections of neophytes concerning the research giving direct quotations of their thoughts and feelings selected from diary entries.

Diaries were analysed under two sections; reflections of the neophytes, as a whole, while they were at YADIM and after they joined DECOBA.

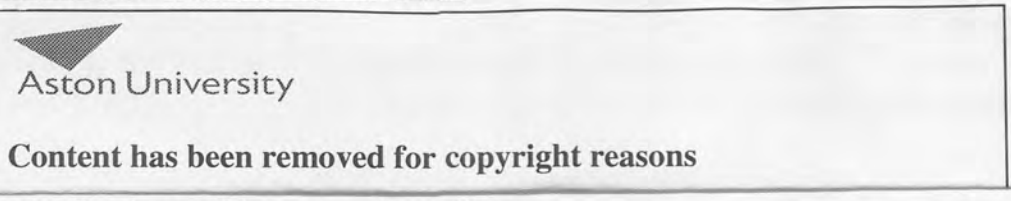
6.9.3.1 Analyses of Neophytes' Diaries at YADIM

As in the questionnaire analysis, diary entries which were written while neophytes were at YADIM, were analysed for content and the following categories concerning the enculturation process were identified:

Level of comprehension of the lecture content:

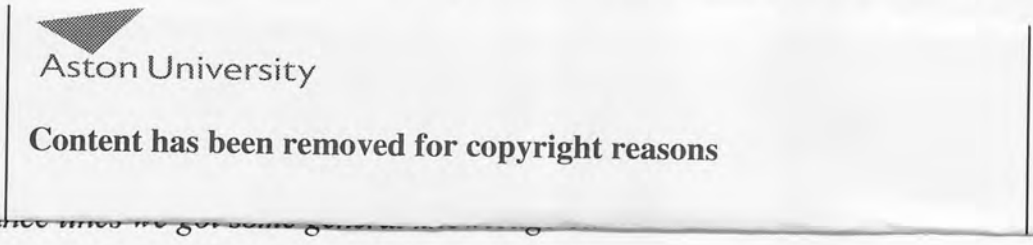
It has been found that the content of some lectures at the faculty, particularly at the initial stages of the enculturation period was found somewhat beyond the grasp of some of the learners. However, in the course of time, an increase in the level of comprehension was noted as: *"Now, I can understand the lectures better than before"*.

Familiarisation with lecturers and the TDC:



Neophytes' reflections of the concordance lines:

One final point mentioned by the learners was related to the concordance lines. The neophytes stated that they did understand the concepts and sometimes they had a general understanding of the concepts from the concordance lines, yet they pointed out that the text supplied more information. In connection with the concept of taxation, for example, they pointed out that:

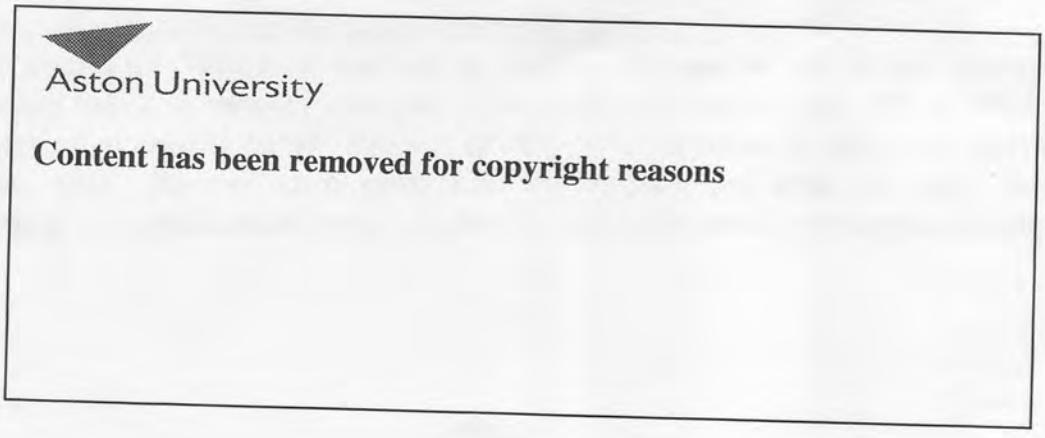


concordance lines we got some general [illegible]

6.9.3.2 Analyses of Neophytes' Diaries After Joining DECOBA

The following diary entries reflect the neophytes' opinion after they have become members of DECOBA.

Expressing initial reaction: Although they did not articulate it openly when the idea of enculturation was put forward to them, neophytes, in their diaries, stated that their initial reaction to the idea of enculturation was not very positive, at all.



Recommendation: As in the evaluation form analysed above, most students pointed out that enculturation studies should continue in the following years and be extended to other classes, as stated in the following diary entries:

Many of them expressed their thanks for having been given the experience of learning basic concepts of their target discipline, which they considered formed the foundation for their future academic studies. All students in the enculturated group pointed out that in the TDC they were treated differently from their non-enculturated counterparts who had attended YADIM but who had not received the same training. They stated that they had the privilege of experiencing such a programme and saw themselves more knowledgeable from the rest of the students who started DECOBA having completed YADIM. For them, the difference was related to paying visits to lectures and being offered what they considered as "a useful preparation for their academic studies".

Positive contribution to academic studies:

[illegible] YADIM [illegible] were able to understand the lectures

them".

The above remarks are very important as they highlight the acquisition of domain-specific knowledge occurring in both languages, Turkish and English, as pointed out in the analyses of TAPs. The above extracts reflecting the experiences of neophytes confirm Ausubel's (1961) concept of meaningful learning, as explained in Section 3.3.1.

At this stage it may be appropriate to quote Bartholomae (1985 in Clark 1992:139) who argued that "it is hard to see how readers can have a purpose before they are located in a discourse since it is the discourse with its projects and agendas that determines what readers can and will do". In actual fact, it is equally hard to see how neophytes can develop a sense of reading in relation to the demand of the target faculty without becoming fully knowledgeable about the requirements of the target faculties. The most significant benefit of undertaking such an investigation was to give the students a vested interest and a short-term benefit for their effort after they became members of their faculty.

As is clear from the overall analysis of the evaluation form and diaries, enculturation had formed a good *bridge* between YADIM and the TDC, had familiarised the neophytes with the fundamental concepts of their discipline, and made a positive contribution to performing many academic tasks required from them in their academic context. However, some concordance lines were found less helpful in understanding the meaning of concepts.

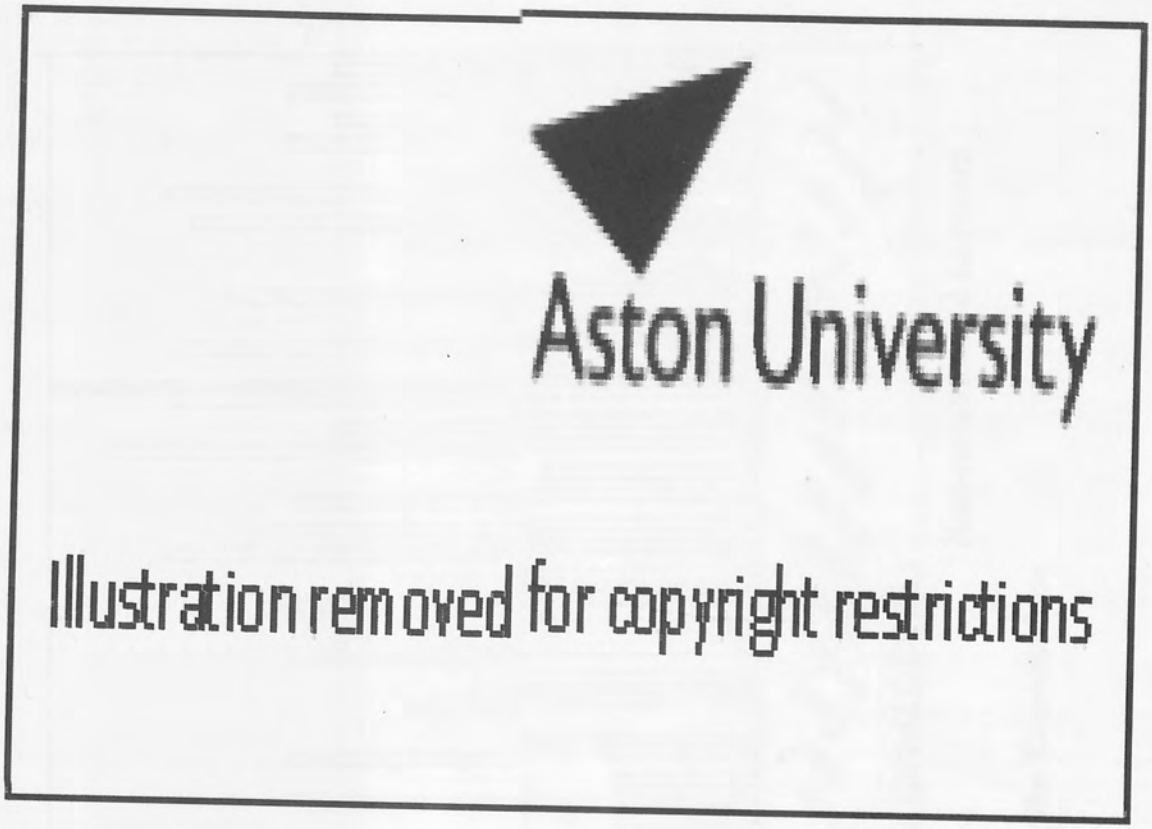
In the following section, we present the data obtained from the examination results. As in the case of written recall protocols, the data concerning examination results was obtained during the post enculturation stage of our research when neophytes' performances were monitored in their faculty, following their completion of YADIM. Our aim was to find out the extent to which enculturation contributed to their academic studies at DECOBA.

6.9.4 Data From the Examinations

Three examinations given by the lecturers of English-medium courses to the first year undergraduates, were used for the second year monitoring. The students included EG in our

research as well as their first year counterparts who had attended YADIM but not received any enculturation and now were members of their community at DECOBA, that is, non-enculturated learners taking the same courses. The examinations which were part of the course requirements were administrated at three points in the academic year; one at the beginning, the second towards the middle and the third towards the end of the academic year. Therefore, all first year students had to take them.

Each examination consisted of 6 questions and each student's examination is scored out of 100 and marked by the lecturers. The examination results are compared between the enculturated and non-enculturated learners and the results are shown in Table 6.8. It is not the purpose of the present research to discuss the type of questions asked and/or the content of the learners' responses to the examination questions. The main objective is to offer an overall evaluation of the results obtained. When the results of enculturated and non-enculturated learners are compared it can be seen that enculturated learners performed much higher in the three examinations administrated. As can be seen from the table, four students in the non-enculturated group the second examination result is zero,as they could not answer any question, at all. Besides giving quantitative data in the table, some answers are enclosed in Appendix XIII to provide comparative data between the two groups. Both qualitative and quantitative evidence provide further support that enculturation has had a significant impact upon neophytes' academic performances.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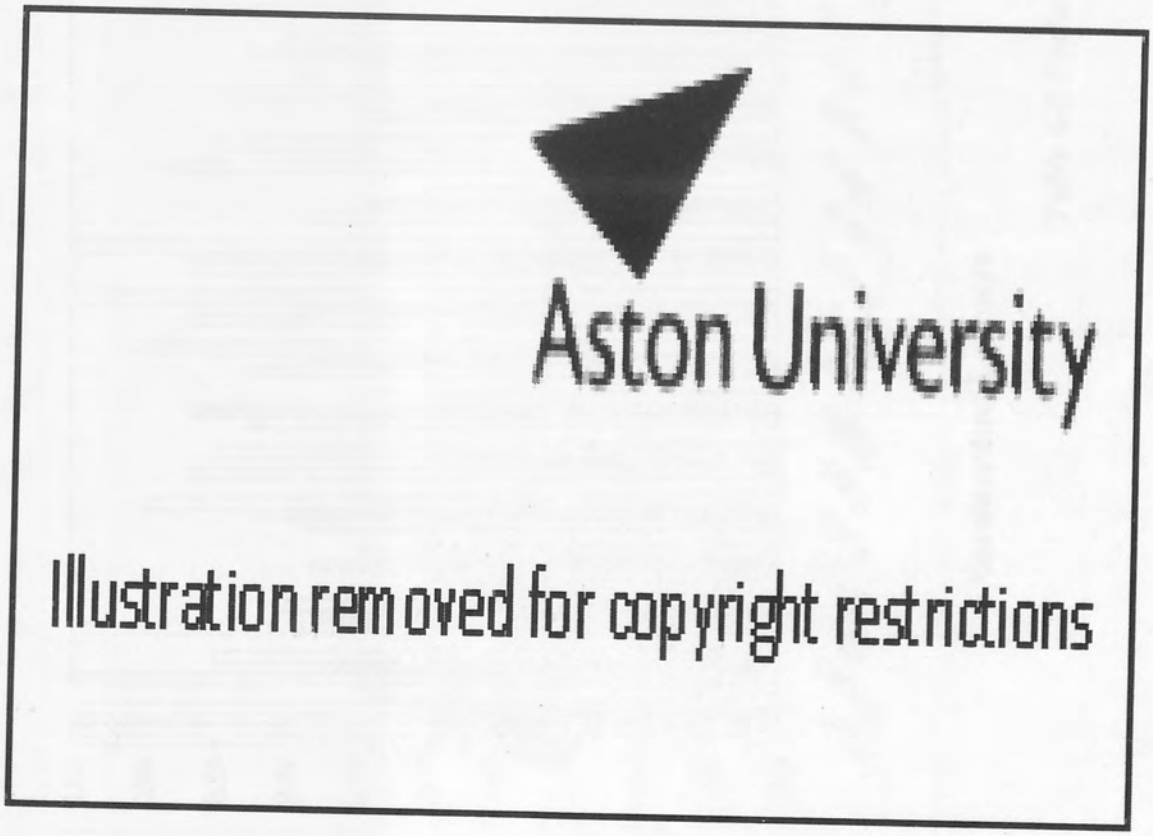
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6.10 Summary

In this chapter we offered the presentation and analysis of the data collected both during the enculturation and post-enculturation stages of our investigation. The first source of data presented was related to tracing processes involved in knowledge acquisition and concept formation from the very beginning to the very final stage of development through the TAPs. We discovered on the basis of the data analysis how neophytes acquire domain-specific knowledge and focused on the question of how they incorporate domain-specific knowledge into their own cognitive structure. We have found that knowledge acquisition concerns conceptual change from one's existing knowledge, that is, knowledge accumulated from previous experience, to domain-specific knowledge, i.e. formal knowledge concerning the discipline of economics and business studies. In the methodological framework developed for this purpose, we attempted to analyse and represent the existing knowledge structures of neophytes in order to describe the ways in which these structures are applied by them in the acquisition of knowledge and compare the acquired knowledge structures with those required by the expert members of the TDC.

We have discovered that analogies spontaneously generated by neophytes are the major mechanisms in the process of acquisition of domain-specific knowledge. In addition we identified cases when reasoning was based on metaphors. The typical source domains from which analogies were generated include school, food, seller, etc. In the case of metaphorical reasoning, CONTAINER, PATH and JOURNEY were the main metaphors used. The type of analogies generated and the changes that occur in the type of analogies were explained. Analyses of the TAPs have shown that working with concordances neophytes were able to match their own knowledge structures and knowledge acquisition strategies with the compilation of concepts embedded in co-text. In this way, they progressively built up a mental picture or a scene of the concept by attending to successive lines of the concordances either by filling in empty slots of their knowledge base or revising it dynamically. During this process, they were also aware of the changes taking place in their initial knowledge.

We also described the reasoning strategies made use of by neophytes and their possible contribution to the acquisition of domain-specific knowledge. We have found that cognitive strategies including analogical and metaphorical reasoning, relevance strategy, hypothesis

formulation, hypothesis testing and elaboration had an immediate effect on the acquisition process; whereas interactional strategies had a more intermediary effect. In our analysis, we have found that as knowledge which is acquired during the enculturation period increases, the learners find themselves in a better position to elaborate on the concordance lines based on their knowledge about the world. Although in the earlier stages of enculturation, elaboration was made with reference to learners' prior world knowledge and personal experiences, this was gradually being replaced with domain-specific knowledge.

In addition, neophytes' awareness of the cultural elements was demonstrated and a justification was offered for the methodological framework adopted for tracing the processes. This was followed by describing the pedagogical benefits of think aloud protocols ıtilised as a method for analysing such processes. The next source of data presented was obtained from the written recall protocols which aimed to determine the product of what was acquired from a static view and the data collected from the evaluation form and dairies. The final source of data included the examinations which were administered at DECOBA by the lecturers. The results obtained from both the recall protocols and the examinations were compared to those of the non-enculturated learners taking the same course at DECOBA.

We discuss the benefits of enculturation and evaluate research findings in the next chapter of the thesis.

CHAPTER VII

DISCUSSION OF THE RESEARCH FINDINGS

7.0 Introduction

Chapter 6 dealt with the presentation and analysis of the data. This chapter aims to discuss and evaluate research findings, and highlight their contribution to the theory. It also focuses on learners' motivation, awareness of this kind of learning and consciousness raising, through the evidence obtained from three major sources of data collection tools. First, evaluation of the TAPs and the types of and changing nature of strategies will be presented. Next, research findings obtained through the WRPs and the examinations administered at DECOBA, after the neophytes were initiated and became members of their faculty, will be given. The results obtained will then be compared with those of their non-enculturated counterparts who attended YADIM at the same year, yet were not exposed to the same enculturation studies. Then, a discussion of the evaluation form administered to neophytes and findings obtained from diaries will be given. Since the data is collected from multiple sources the discussion of the data will be offered in the order in which it is collected and finally an overall evaluation of it will be made.

7.1 Findings from the TAPs

Based on the analysis of the TAPs, we have discovered that analogical and to a certain extent metaphorical reasoning have played an important role in neophytes' attempts to acquire knowledge of economics and business studies and to understand a new phenomenon that is not quite similar to anything they have experienced before. Before discussing these findings, it seems crucial to offer a clarification to the long-held debate over what acquisition is, as will be discussed below:

7.1.1 What is Knowledge Acquisition?

It is stated by Rumelhart (1977:265) that:

Our findings demonstrate that knowledge acquisition is a *dynamic* process; it involves a systematic modification and a gradual evolution of one's existing schema whereby the initial knowledge base undergoes a process of change during which concepts of the target discipline are added to the existing knowledge structures largely by analogical reasoning, thus filling in the existing knowledge gap. (See Chapter 6 for details).

Johannes Kepler, the 17th century astronomer who attempted to explain astronomical phenomena, such as the motion of the planets, in terms of physical laws, wrote:

> And I cherish more than anything else the Analogies, my most trustworthy masters. They know all the secrets of Nature. (quoted in Polya, 1973:12)

Similarly, in our investigation, we have discovered that analogies generated by the neophytes revealed the secrets of knowledge acquisition and concept formation through L2; concepts of a discipline which were new, abstract and complex to them. As for the content of the knowledge acquired, it seems particularly difficult to separate knowledge of the language from general knowledge of the world. What can be stated instead, is that conceptual knowledge of the discipline, which includes linguistic, cultural as well as encyclopeadic information constitute components of the acquired knowledge and that language and knowledge are intimately integrated, as illustrated in the initial and final uptake components of the debates held in Chapter 6. TAPs have demonstrated that neophytes were drawing upon and exploring their prior experiences to make inferences and construct interpretations of the incoming information. Based on the data analysis, it can confidently be argued that acquisition of domain-specific knowledge is not a separate process but is part of our experience of the world. It can also be maintained that before the stage of acquiring domain-specific knowledge, an accumulation of a general world knowledge is needed so that relevant existing knowledge structures can be brought to bear upon the knowledge to be acquired, facilitating the acquisition process.

Several debates, particularly where analogical and metaphorical reasoning were employed, illustrated this point. Neophytes, for example, when reasoning what *substitute goods* is referred to their knowledge of a *substitute teacher*, being aware of the underlying structural relationship involved, that is, one element replaces another one and similar underlying relations were applied to the concept of substitute goods in the target domain. The same reasoning strategy applied to concepts, like *inferior goods, domestic* and several others, as discussed in the previous chapter. In almost all the debates held, the point of departure for

the neophytes was their own experience. In relation to Michalski's "trumpet model" described in Section 3.4.4, debates have demonstrated that neophytes did not look at the context in isolation; they took into account all the relevant information ranging from general knowledge to contextual knowledge. In this way, T-D and B-U processes were simultaneously invoked in an interactive mode when processing knowledge, within task-related reasoning. Due to this finding, in addition to being a *dynamic process*, acquisition can also be considered as an *interactive process*.

Acquiring domain-specific knowledge entails acquiring domain-specific schemata, frames and scripts. In analysing TAPs, it was pointed out that in order to differentiate components of knowledge being acquired within the discipline of economics and business studies a differentiation was made. We considered economics as a macro domain, within which we identified some other more specific knowledge structures and referred to them as, for example, *commercial exchange frame, shopping script, substitute goods frame*, where appropriate. Acquiring knowledge of economics and business studies therefore involves integrating these domain-specific frames and also scripts into one's existing knowledge structures. It can be concluded that concept formation is a complex process; it is the degree to which neophytes' perception of concepts existing within that particular discipline overlaps and/or approximates with those of the expert members of the TDC.

Acquisition of domain-specific knowledge can further be defined to occur when specific concepts of the target discipline are substituted for the slots or variables of learners' general schemata or knowledge bases in such a way that learners' mental representation for specific knowledge becomes an instantiation of a domain-specific schema for that particular knowledge type. The initial knowledge base of neophytes concerning *inferior goods*, for example, was in relation to *goods of poor quality*, which was not entirely consistent with the shared level of understanding of the members of the TDC. This meant that there were further slots yet to be instantiated with the concepts of the target domain. In the final uptake neophytes were able to substitute partly instantiated slots in their schemata with new information of the TDC stating that "an inferior good is a good which people buy less as incomes rise. For example, they may switch from margarine to butter. A second hand good could be an example of an inferior good, but not necessarily an inferior good".

In addition, our research offers a clarification to the distinction between acquisition and learning, another un-clarified concept in the literature. As stated in Chapter 3, the debate on learning and acquisition dichotomy has occupied an important place in language learning theories, yet it has not been tested under any experimental condition. The present research has offered an answer to this area, as well. It seems difficult to draw a clear-cut division between learning and acquisition, as Krashen has done (1983). Acquisition and learning seem to be quite related concepts, with acquisition probably leading to learning, as argued by Norman (1980), in other words, acquisition being the initial and a dynamic process and learning the end-product, static, as it stands, but, learning, too, is a dynamic process. On the other hand, we quite agree with Krashen that acquisition results from the natural exposure to language without any teacher control, as has been achieved in the context of the present research.

Further research findings based on the TAPs will be offered below:

7.1.2 Discovering Stages in Knowledge Acquisition

On the basis of analysing TAPs, we identified three stages as occurring along the acquisition continuum, namely *initial, intermediate* and *advanced stages,* consecutively. The main differentiating feature of *the initial stage* was that at this stage there was a tendency among the neophytes to focus on the key word with its immediate co-text. The intermediate stage was marked by the neophytes activating much of the analogies which were accessed from various conceptual domains, such as school, food, seller, etc. helping as a *bridge* in understanding the target concept. The analogies activated were in the nature of *between-domain analogies* when neophytes lacked domain-specific knowledge and were in the process of building up a picture of the knowledge of their target discipline. As the most distinguishing feature of the advanced stage, there was a noticeable growth in the neophytes' domain-specific knowledge, which was reflected in the initial and final uptake they produced and in relation to the contribution they made to the discussions (see debates on *monopoly and fiscal* in Chapter 6). Another differentiating criterion of this stage was related to the neophytes' tendency to generate *within-domain analogies*.

The following research findings discuss the type of analogies generated.

7.1.3 Common Features of Analogies Generated

The type of analogies identified include *positive analogies, negative analogies, between-domain* and *within-domain analogies.* Each of these will be described below:

7.1.3.1 Positive Analogies

Analogies, as in the case of *domestic goods* and *substitute goods*, (discussed in Chapter 6), are in the category of *positive analogies* and they are "justified" (Dejong, 1989) because mapping is justified as a manifestation of an underlying common abstraction in which neophytes retrieved an analogy, developed it in the process of acquisition when they were able to see the underlying common relation between the source analogy and that of the target concept and ended up in a *shared level of knowledge* agreed upon by members of the TDC.

7.1.3.2 Negative Analogies

In addition to generating positive analogies, there were cases when neophytes drew upon negative analogies, which resulted in knowledge not entirely shared with the expert members of the TDC. The debates on *specialisation and return* constitute examples to negative analogies. In fact, the neophytes accessed an analogy from their source domain which was not particularly helpful in enabling them to reach the shared level of understanding with the members of the TDC. Since the knowledge acquired as a consequence of negative analogy was inconsistent with that of the expert members of the TDC, this knowledge went through a *restructuring process*, after the neophytes were exposed to more information from the text. As a result of this process, learners acquired a new schema which was imposed on the previously acquired knowledge, leading to either a *strong restructuring (strong conceptual change)* as in the case of *specialisation or a weak restructuring (weak conceptual change)* as in the case of *inferior goods.*

7.1.3.3 Between-domain and Within-domain Analogies

Another major finding obtained from the TAPs showed that in addition to generating positive and negative analogies, two types of analogies were discovered to have been generated, namely *between-domain* and *within-domain analogies.* Between-domain analogies were mainly generated during the intermediate stage when neophytes lacked

domain-specific knowledge and were in the process of building up knowledge of their target discipline. It has been found that learners were able to access an analogy from various source domains and see some level of similarity in salient properties between the source analogy and the target concept, as a vehicle for discovering the underlying structural relationship between them, ending up in some level of understanding of the target domain, as in *substitute goods* and *domestic goods*. It can be concluded that as stated by Vosniadou (1989:12) "what develops is not the analogical mechanism itself but a conceptual system upon which analogical reasoning mechanism operates". After the neophytes had accumulated more knowledge of the target domain, they started drawing analogies within the target domain itself, i.e. they used within-domain analogy more frequently than between-domain analogy, the target domain being economics and business studies, as in the debate on *retailer*.

The following research findings deal with common points between scientists and neophytes in generating analogies, based on the TAPs.

7.1.4 Parallelism Between Scientists and Neophytes in Constructing Analogies

The present research has demonstrated that scientists are not the only thinkers who made use of analogies in trying to gain a systematic understanding of the world. Like scientists, adults have an analogical mind and a reasoning capacity; as they are capable of making predictions, generalisations, transferring the underlying conceptual relations from known domains into abstract and new domains, all of which involve the transfer of the known to the more abstract and unknown, thus generating analogies without any outside intervention. However, the reasoning process underlying analogical thinking in adults may not have operated to the same extent as that operated in scientists. Undoubtedly, the scientists who have been referred to in Section 3.9.2.1 were much older and more mature in their thinking and cognitive development compared to adults involved within the scope of the present research. Our students, on the other hand, being young, may not have drawn upon such lengthy analogies as those of Newton, Rutherford and others.

Another major difference between scientists and neophytes is that everything described related to scientists worked within one language only, in the case of students there has been some overlap of meaning of a word which they have learned in a foreign language

and their knowledge of the source domain is also knowledge they have acquired in their daily interaction with their environment. They have, for instance, learned *domestic* in their classes at school as referring to home and as one special collocation they learned *domestic animal*, for which they learnt as a synonym the word *pet*. The reasoning and mapping that took place during the acquisition process is obviously based on what they knew about home in the more concrete sense, which is largely knowledge acquired in their daily lives in a Turkish context and using the Turkish language.

On the other hand, the type of analogies which seemed appropriate to scientists may not appear so to the neophytes. What is common, however, is the underlying processes and steps that operated in analogical reasoning, which facilitated the discovery of scientific laws in the case of the former, that is, the scientists, and the acquisition of knowledge which was new and unknown for the latter group, the specific knowledge of the target discipline of economics and business studies. Due to these reasons, the type of analogical reasoning discussed in Section 3.9.2.1 in connection with scientists is not qualitatively different from the kind of analogies employed by the neophytes. The differences between scientists and students in their ability to acquire knowledge can be interpreted as being due to differences in the amount of knowledge that has been acquired, not as differences in basic underlying abilities.

7.1.5 Contribution of Analogies to Knowledge Acquisition

It is possible to draw the following conclusions on the basis of the analogies spontaneously generated by the neophytes as contributing to the acquisition process:

Providing a bridge between the source analogue and the target concept: Analogies have served the purpose of a *bridge*, an intermediate case, between everyday concepts and that of the new target concept being acquired. Whenever neophytes encountered a new situation, they tended to interpret it in terms of their existing schema or that of the knowledge base. As stated by Johnson-Laird (1983), the realisation that the target domain into which new knowledge is to be acquired is analogous to another more familiar source domain can enable a thinker to reach a better understanding of the target domain by transporting knowledge from the source, has been proved by the present research. Debates on *substitute, domestic* and *inferior goods* constitute examples for this.

A mechanism of *aid* to knowledge acquisition: In the present research, analogical reasoning has provided a mechanism for enriching, modifying and sometimes radically restructuring the knowledge base. It was stated in Section 3.4 that acquisition does not occur in a vacuum; yet, it is based on some level of knowledge. As neophytes progressed along the acquisition continuum by accumulating domain-specific knowledge, their existing schema expanded and served as the source domain from which a new domain-specific schema was generated carrying over features of the existing schema on the basis of several principles of analogical reasoning. We have found that the generation of analogies has been a powerful mechanism, a vehicle, an *aid,* and having the potential of activating prior knowledge, extending it over to the target domain to bear on the acquisition of new knowledge and sometimes produce radically new information about the target domain (Clement, 1981; Vosniadou, 1988).

Meaningful nature of acquisition: Also, in a constructivist perspective, meaningful learning occurs when students find or create connections between new and existing knowledge (Ausubel, 1968; Parawat, 1989; Mason, 1994). Analogies helped neophytes activate their current knowledge from their source domain, everyday experience, and link it onto a relatively less known domain, a specific discipline into which discoveries were being made and a new set of knowledge was being acquired, in a meaningful way. When an analogy was drawn, a powerful relation was constructed helping learners make a meaningful link between the current knowledge and the target concept. Such a meaningful link, as stated by Ausubel (1968), avoids *rote learning* and fosters *meaningful learning*. As was also confirmed by Parawatt (1989) good analogies are "interactive" in a way that they result in a meaning that is new to the learner.

In the generation of analogies, pretty much the same steps as identified by Holyoak & Thagard (1995) were followed by the learners with some differences and even additions. For example, judging the relevance of the analogy produced by one of the neophytes in the group does not exist in the steps leading to analogical reasoning outlined by Holyoak & Thagard (ibid.). Therefore, the second step below can be considered as *an addition* to their model. The steps outlined below occurred generally in the order given and neophytes were often observed to move back and forth between them several times while gradually completing each step. Each step below will be illustrated in relation to steps followed during the debate on *domestic economy*.

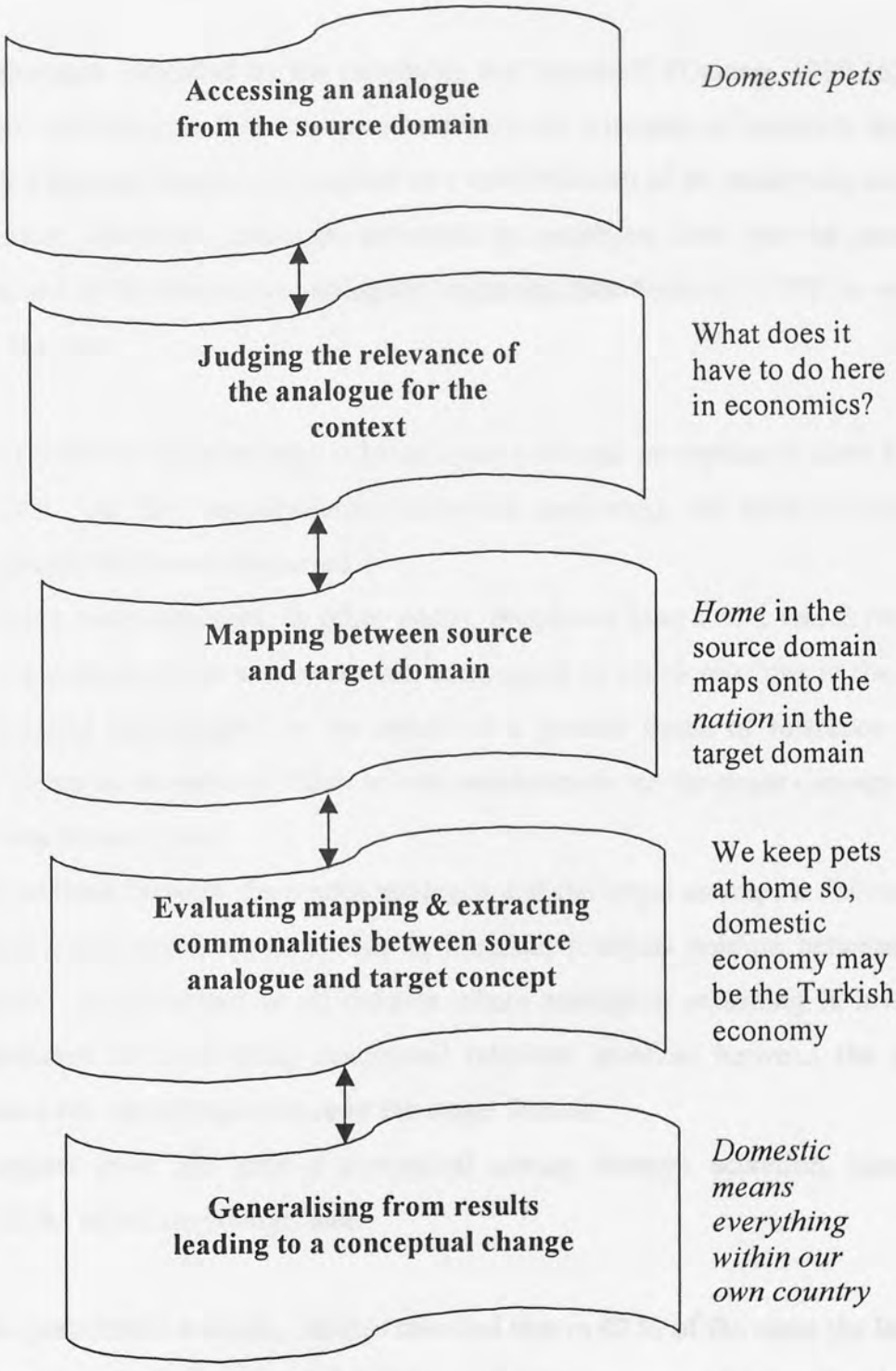

Figure 7.1 Steps Involved in Analogical Reasoning

Analogies were generally introduced at the beginning of each debate by one member of the group. In most cases, the relevance of the analogy for that particular context was questioned, which led to the generation of another analogy. Once the underlying structural relations between the analogue and the target concept had been understood, neophytes were then able to move across to the target domain and began reasoning within the target

domain. There was also *extended analogical mapping* in the uptake section, as in the case of *inferior goods*.

In addition, analogies generated by the neophytes are "justified" (Dejong, 1989:362) and they are "good" analogies, as they are consistent with the principles of structure mapping outlined in 3.9.2 because mapping is justified as a manifestation of an underlying common higher abstraction. Moreover, analogies generated by neophytes have met the constraint principles outlined in the section on analogical reasoning (see Section 3.9.2.2) in view of the following reasons:

a) Neophytes' generation of an analogy is based upon a holistic perception of some kind of similarity at first. At the deep similarity (structural similarity), the level of relational structures or commonalities are discussed.
b) Analogies have been consistent, in other words, neophytes have found which relations between the components in the source domain correspond to which relations in the target domain. The initial knowledge - in the nature of a general frame of reference - was elaborated by means of an analogy which helped neophytes to see the target concept in the light of what they already knew.
c) The correspondence between the source analogue and the target concept is followed by the mapping of higher-order relations, that is, identical relations holding between non-identical objects. As illustrated in all debates where analogical reasoning is involved, neophytes discussed the underlying conceptual relations involved between the source analogy accessed and its correspondence in the target domain.
d) The consequent point has been a conceptual change through accretion, tuning or restructuring of the initial knowledge base.

In terms of the quantitative analysis, debates revealed that in 82 % of the cases the learners started with some level of prior knowledge, whereas in the remaining 18% of the debates, neophytes started with no apparent schema or knowledge base. That is, when they were asked to write down their existing knowledge on a particular concept they claimed that they could not figure out anything about it. Following TAPs, we found that in about 80 % of the recorded data, some level of acquisition had taken place. Out of 80 % of the recorded data analysed, 67% corresponded to *full uptake*, and 10% to *partial uptake*. In the remaining 3% of the data the acquired knowledge following the debates was

inconsistent with the shared level of understanding of the TDC members. One of the reasons why some groups acquired full uptake while others were partial or no-uptake following the debates may be due to the composition of groups in which one of the members due to differences in his/her background knowledge might have been more knowledgeable. Some students were more attentive and tried to interpret concordance lists in more details. Another reason can be related to learner's ability to generate analogies. A further reason could be attributed to the limitations of the concordance lines as will be dealt with in Section 7.3.2.

Therefore, the groups which did not end up with full uptake needed additional information. When they were exposed to a larger context of information, in the case of the 3% inconsistent knowledge category, the initial knowledge was completely modified into a fundamentally different frame through a process of *restructuring*, as illustrated in debates on *specialisation* and *return*. As for the groups which ended their debates with partial uptake, what they acquired in their initial uptake was confirmed and extended through the *tuning process*. 18 % of the groups, of which debate resulted in *no-initial uptake*, acquired no domain specific schema or frame.

While the above section focused on discussing research findings from the TAPs, the section below evaluates the findings concerning the reasoning strategies employed by the neophytes during the process of acquiring domain-specific knowledge and the way in which these contribute to the acquisition process.

7.1.6 Evaluating the Use of Strategies

Spontanous use of strategies -*cognitive* and *interactional reasoning strategies*- are observed to play a significant role in the acquisition of domain-specific knowledge. It can be concluded that the cognitive reasoning strategies, ranging from analogical and metaphorical reasoning, inferencing, evaluation, hypothesis formulation, hypothesis testing, elaboration and generalisation, which were employed during the course of acquiring domain-specific knowledge, had an immediate effect on the acquisition process, that is, contributing to acquisition directly, whereas the interactional strategies, such as questioning the relevance of analogies for a particular context, had a supporting value in aiding the operation of cognitive reasoning strategies, thus contributing indirectly. In the

debates where analogical reasoning was activated, analogy had a more direct effect, as with the debate on *inferior goods* (see Chapter 6), while the remaining cognitive strategies such as hypothesis formulation, testing, evaluation and generalisation all facilitated the operation of analogical reasoning thus contributing to it.

Although concordance lines were the main source of input, equally important was that of the output of the learners that provided the secondary source of "comprehensible input" (Long & Porter, 1985). The interactional strategies such as asking questions, replying, confirmation, etc. had an intermediary value or that of a "mediating role" (Ellis, 1994:529) on the acquisition process. As illustrated by several debates, comprehension questions which pointed to gaps in the learners' existing knowledge structures, either in terms of the lexical or that of the conceptual area, led to some explicit negotiation among the learners and were answered by more knowledgeable members of the group.

The analysis of the extent to which learner output has been a contributory factor to acquisition of knowledge seems to show that there is a direct relationship between interaction and acquisition. For example, those students who sought answers to comprehension questions did benefit from the responses ensued in over 80% of the cases, either by an attempt to answer it collaboratively by attending to contextual clues or providing a reply by a more knowledgeable member of the group. The second advantage of negotiation was that it helped learners to make better use of their existing knowledge by activating it.

In terms of the quantitative variation in the occurrence of these strategies, it can be concluded that during the elementary stage, the use of strategies were limited to comprehension question, hypothesis formulation and testing, inference, evaluation and generalisation. At the intermediate stage in the acquisition of knowledge, analogising, inference, evaluation, elaboration mainly in relation to learners' personal knowledge, self and other repair, etc. have a proportionately larger share. However, complementing, elaboration with domain-specific knowledge increased with the advancement of learning, which implies that individuals can contribute to the discussion with their domain-specific knowledge (see Tables 6.2 and 6.3 in Chapter 6). In Chapter 3/Section 3.7.2, it was assumed that the process of collaboration is expected to lead to a situation where the neophytes have acquired shared meanings and shared definitions, thus, acquiring a similar cognitive development with respect to the expert members of the TDC. This assumption

has been confirmed by the outcome of the present research. As demonstrated by the debates throughout Chapter 6, the initial schema was continually changing as neophytes became exposed to the input and were involved in the discussion. As a result, the degree of overlap between the individual knowledge base and the knowledge of the TDC members seemed to overlap. Enculturation thus served to increase the set of shared knowledge and decrease the need for explicit negotiation and during this process, neophytes became acquainted with new concepts by creating new connections between old concepts and/or redefining old concepts in terms of the new ones. In Section 3.9.1 of the research it was stated that spontaneous use of strategies remain an unexplored research field. By identifying spontaneous use of the strategies our research makes an important contribution to language acquisition theories.

The following section deals with the contribution of our teaching methodology of using concordance lines as a basis to knowledge acquisition.

7.2 Contribution of Corpus to Knowledge Acquisition

Clearly, there is much more sophisticated exposure to linguistic input than the concordance lines used in the present research study which were restricted to a minimal context provided by the 4 words on either side of the key word due to the fact that the nature of our research entailed a minimalistic approach in order to detect the patterns of reasoning in neophytes' minds through the TAPs. It was feared that the wider context might cloud the identification of the thinking processes involved. But, clearly any real world pedagogic application would call for richer, although wider context. In order to assist future researchers concerned with utilising the same methodology, the benefits as well as the limitations of the concordances will be presented.

7.2.1 Benefits of Concordances

The advantages of utilising concordance lists as a source of input during the knowledge acquisition process can be listed as follows:

Empirical data: Since the corpus is built on data-driven learning, that is, the actual texts utilised by the TDC members, the concordance lines provided authentic data in terms of collocational features and numerous examples of the same key word with its significant collocations and have given learners immediate contact with the target language in use. As

confirmed by Tribble & Jones (1990:18), "the principal advantage of concordancing is that it gives learners direct access to patterns that exist in natural language" related to the target language.

Short cut to information: Although the text provided more detailed information, in most cases concordance lines provided a concentrated source of knowledge, through which neophytes were able to get the gist of the information or even obtain the main idea which meant that by thinking and focusing on the data, they were able to get information that is likely to be most memorable for them in their future academic studies, as in the case of *scarce goods, capital goods, substitute goods*, etc. The evidence for this was obtained through the reflection of neophytes after they were initiated and became members of their faculty.

Promoting discovery learning: As argued by Tribble & Jones (1990:35), the application of concordance output favours "discovery learning". In the collaborative learning environment, concordance lines presented sections of the target language in a way that encouraged neophytes to discover and construct new knowledge for themselves, rather than being spoon-fed as in the traditional teacher fronted classroom situation. By presenting several examples of the same word simultaneously, concordance output increased the chances of deduction similar to a problem-solving task. This minimal amount of information and the repeated lines of concordances forced learners to formulate a hypothesis, test it, reformulate it and so on, and have the full responsibility of learning themselves.

Pointing to a particular frame of reference: The words appearing in the environment of a key word, or the collocation of a particular lexical item point to a particular frame of reference and once this schema is activated, it has generated expectations about the related frame of reference, similar to what Fillmore (1985) suggested in connection with the "frame-related words". Thus, words such as *goods* and *exchange* have directed the neophytes' attention towards a *commercial frame* and other expressions incorporated within it. It was found that in many cases, the lists of concordance lines brought together words occurring under a particular frame, as in the case of *collective bargaining* where words like strike, union, sitting round a table all pointed to the same frame.

Cyclical effect in the acquisition process: The repeated nature of collocation, that is, the fact that the same words collocated with different words and were introduced to the learners some time later in the acquisition process, has produced a cyclical effect on the acquisition of knowledge. For example, *inferior goods* was acquired at an earlier time in

the acquisition process. However, several weeks later when the concept *demand* was being acquired, inferior collocated as *demand for inferior goods* or *demand for substitute goods*. This collocational feature was particularly helpful for neophytes in that when previously learned concepts recurred some time later in the acquisition process they were recalled, integrated into the current knowledge, assimilated and consolidated better. The evidence for the integration of knowledge has been observed from the manifestation of previously debated concepts into the current discussion. (See Appendix XIV for sample debates illustrating this point).

In addition to concordance lines which were found particularly useful in helping neophytes reach the shared level of understanding, the amount of information provided by some concordances did not always contain sufficient information to deduce the relevant meaning of a concept or were found misleading. They will be discussed in the following section.

7.2.2 Limitations of Concordances

While concordance lines have provided some helpful patterns, it has been found that they have not capture more complex co-textual patterns; they presented certain drawbacks and limitations. The lines from which neophytes could not gain much knowledge and which provided only an inadequate amount of information led them to formulate some hypothetical knowledge which ended up in *partial uptake* or the *restructuring* type of knowledge acquisition.

Some problems encountered during debates based on concordance lines have already been pointed out earlier, in Chapter 6. During the debate on *inferior goods* (see the fourth debate in Chapter 6), it was stated that *second-hand* on the concordance line was a major distracter leading to some misunderstanding among the neophytes about what *inferior goods* would be. As a result, the type of knowledge initially acquired went through a process of *weak restructuring* after the neophytes had been exposed to more information. For some concepts, the reason why all group members ended up in no uptake, can be accounted for in terms of the limitations of the concordance lists. The amount of information provided did not lead to the acquisition of knowledge and more information was needed. One example was *opportunity cost*. The neophytes did not yet have an *opportunity cost* frame in L1 and following the debate, none of the group members could come up with any idea of what opportunity cost might be.

Concordance lines of *Opportunity Cost*

best alternative use. Opportunity **cost** also indicates how much
the lawyer's opportunity **cost** is the 20 flowers
good or service. the opportunity **cost** is the alternative forgone.
with the lower opportunity **cost** has the comparative advantage
is called the opportunity **cost** of the capital.
lower than the opportunity **cost** of capital. For if
doesn't earn her opportunity **cost** that is, her potential
the concept of opportunity **cost,** that is, the alternative

The initial uptake of all groups for this concept was that "cost is the value of goods" but they knew nothing about the *opportunity cost*. Following the debate, after exposure to concordance lines, none of the groups could get any knowledge at all, as the concordance lines provided them with extremely limited information. As is clear from the concordance lines above, there is no clue that would fill a slot in the opportunity cost frame. Although the last two lines contain a discourse marker, i.e., that is, exemplifying this concept, due to the limited number of words on either side of the key word, this information has been found insufficient by the neophytes to get the meaning of *opportunity cost*. However, due to the fact that the key word *cost* is preceded and followed by only 4 words, it was impossible to get any helpful information. All groups ended up with some guesses which were inadequate to help them reach the shared level of understanding with those of the TDC members. It was only after exposure to more information from the text that they were able to acquire the meaning of this concept as illustrated by the following uptakes:

This is considered as *full uptake*. Though at the initial knowledge stage, cost was considered in terms of money, the above uptake shows how this changed at a later stage of conceptualisation in abstract terms. In fact, this example is given by the learners themselves rather than the one given in the text.

As the computer programme we utilised provided only 4 words on either side of the key word, it can be argued that with more information provided by the computer this deficiency could be overcome. It was also stated by neophytes in their diaries and evaluation form that the extent to which they were able to obtain knowledge from the

concordance lines depended on the amount of information provided by those lines; they sometimes had a general understanding of the concepts, yet they pointed out that the text supplied more information. Appendix XIV encloses another debate on *perfect and imperfect competition* illustrating limitations of concordances.

Due to the problems discussed above, concordance lists need to be specifically prepared for classroom use according to the needs of the students. Our advice to teachers and/or researchers who wish to use concordances in designing various language learning tasks would be to omit those lines that would easily be misinterpreted and would not be of any help to learners in reaching the appropriate frame of reference required and choose those lines which provide sufficient clues as to the meaning of the concept. In order to assist future researchers or teachers utilising corpus-based data in their classrooms, some methodological guidelines will be offered. For this purpose, the concordance lines which were found to be particularly helpful in formulating the concepts of economics domain were identified and they are enclosed in Appendix XV. It is also suggested that they use computer programmes that would provide a larger span of words on either side of the key word, including full sentence available, in the hope that learners will be able to detect the patterns easily.

7.3 Findings From the Written Recall Protocols (WRPs)

The benefit to the learners in the enculturated group of having acquired a domain-specific frame of reference and the relevant concepts through the enculturation studies was quite evident in the recall protocols of five texts they produced. The analysis of the protocols demonstrated that the written protocols of the enculturated learners were different in terms of the quantity and quality of the idea units produced. Enculturated learners in all proficiency groups produced more idea units in five texts recalled compared to their non-enculturated counterparts. In relation to the qualitative analysis, the number of elaborations and reconstructions were significantly higher. These differences will be discussed below under two categories.

7.3.1 Linking Textual Knowledge with Prior Domain-specific Knowledge

Learners in the enculturated group were able to make appropriate inferences by matching textual information with knowledge frames stored in long-term memory, by a process of "default assignment" in Minsky's terms (1975). They seemed to be able to fill in the gaps

in the texts they were required to recall by a coherent interpretation through elaboration, by establishing correspondences between what they already knew and the information given in the text. It is also by establishing such a connection that they seemed to be able to monitor their comprehension more effectively.

Based on the analysis of the recall protocols, we assume as a hypothesis that this is the evidence of the existence of a schema or a frame, i.e. mental representation of knowledge acquired during the enculturation studies. In the discussion of the TAPs (see Section 6.1), it was explained how this knowledge was acquired. The implications of the effects of the memory capacity were also clear in the overall recall protocols of the students as evidenced from the high number of idea units recalled.

What is more noteworthy is that even the low-proficiency learners in the enculturated group scored higher than high non-enculturated ones. The findings obtained from the protocols confirm the previous research which demonstrated that readers who are familiar with the content of the text, in L2, understand and accurately recall more than the readers less familiar with text content (Johnson, 1982; Steffenson et al., 1984).

The findings from the qualitative analysis helped us identify three types of transformation categories, *elaboration, reconstruction* and *distortion*. The occurrence of the first two categories was much higher among the EG, while there were more instances of distortions among the NG. This can be accounted for by the fact that prior domain-specific frame of reference was an important factor in enabling learners to make meaningful elaboration of the given information by going beyond what is explicitly stated in the text. It seems that relevant schemata, when activated, have been particularly useful as the framework for incorporating new knowledge and the specific relevant ideas, to which new knowledge entries could be connected, thus leading to meaningful learning, as discussed in Chapter 3. As for the qualitative dimension of the acquired knowledge, the percentage of elaboration and reconstruction was higher in the EG and there were fewer examples of distortions occurring, as presented in Tables 6.6 and 6.7 in Chapter 6. It can be concluded that although all these changes as elaboration, reconstruction and distortion can be considered as an integral part of the normal comprehension processes, as evidenced in the protocols the lack of domain-specific knowledge constantly held up the efficient acquisition of knowledge from texts for the NG who had received no enculturation.

7.3.2 Differences at the Lexical Level

Many of the non-enculturated learners, particularly in the low-proficiency group, seemed to be struggling with the bottom-up features of the text which delayed immediate comprehension and accessing domain-specific knowledge, as evidenced from their recall protocols. In the first three texts (see Table 6.4 in Chapter 6), the interpretation seems to show that students focused their attention to lexical items particularly of those which they thought they knew but which were actually confused with others. The second level of difficulty occurred when domain-specific lexical items are misinterpreted in the context of a general frame of reference, such as *interest rate* being misinterpreted in the sense of *being interested in* something. Such misinterpretation resulted in distorted knowledge. Lexical misinterpretation coupled with the lack of domain-specific knowledge led to a distortion of the message. Such problems were easily overcome by the learners in the EG group by adopting appropriate strategies such as lexical substitution (government assesses tax was replaced by government takes tax, etc.), inferencing as they had a larger subject-related vocabulary stock due to their previous exposure to enculturation studies. Due to their prior domain-specific knowledge, the readers in the enculturated group were able to connect the new information in the text to their own knowledge structures.

The *product* of what has been acquired was investigated by means of the written recall protocols and it gave us encouraging results in preparing neophytes more efficiently for their TDC. The findings from the recall protocols demonstrate that the process of enculturation was a powerful mechanism in enabling the neophytes to access domain-specific texts in their TDC and even after one year of enculturation they were able to remember concepts, relate them to their prior knowledge, efficiently.

7.4 Overall Evaluation of the Enculturation

This section offers a discussion of the data obtained during the enculturation period and following the enculturation at DECOBA before having an overall evaluation of the study. First, the neophytes' personal experiences of the enculturation studies obtained through the evaluation form as well as diaries will be discussed. Next, a brief evaluation of the recall protocols will be made. Finally, the data obtained from the examinations will be given and an overall evaluation will be offered.

In the evaluation forms and diaries, neophytes who experienced enculturation claimed that they found such studies useful in many ways; they became knowledgeable about the concepts of their discipline and they increased their lexical knowledge, all of which helped them understand the lectures and written texts in their specific discipline better.

Analyses of the diaries kept before the neophytes became members of their faculty reflected that their initial reaction to the studies was similar to what Hughes (1985) considers a "reality shock" which newcomers may experience, during the process of enculturation. In fact, that feeling was experienced by the neophytes at the initial stages of the enculturation as "confusion". However, it had gradually died out, giving way to a feeling of "being very much at home and a feeling of easiness" at later stages. This is illustrated in the following diary extract:

It can then be argued that the students' responses in relation to their acquisition of the domain-specific knowledge and our attempts at initiating them efficiently to the requirements of their target departments were *accommodated*, rather than "resisted" or "opposed" (Chase, 1988). It can also be argued that the students learned the conventions of the discourse community, of which they were members with positive attitudes. It was apparent from the evaluation forms and diaries of neophytes that they came to their academic classes already knowing a good deal about the subject of their academic courses, having acquired domain-specific schemata, frames and scripts and they recognised concepts and the culture of their target discipline as "familiar".

Another important outcome of the enculturation was that it reduced tension experienced by the neophytes by bridging the two communities. The analyses of the evaluation forms as well as the diaries showed that enculturation formed a good bridge between the activities of YADIM and those of the TDC, as intended by the present research, as expressed in the following extract:

Neophytes who experienced enculturation have commented that it provided a helpful, innovative approach to learning important concepts of their specialist domain. Once they started their faculties they stated that the concepts chosen were those that they needed most as basics to access domain-specific knowledge and that they were able to see the relevance of studies they had carried out at YADIM to their future studies.

On the other hand, when the results obtained from the evaluation form and diaries of the enculturated learners are compared with the non-enculturated ones, (the students with whom interviews were held during the preliminary data collection stage, see Chapter 1 for details), it can be seen that difficulties non-enculturated learners experienced at DECOBA lasted throughout the first academic year. Moreover, in the same part of the study, it was stated that those students who attended YADIM without experiencing an enculturation had experienced *adjustment difficulties* in their TDC. However, the analyses of evaluation forms and diaries of the enculturated learners shows that such difficulties were overcome by them prior to their becoming actual members of their community and their familiarity with domain specific knowledge facilitated their entry into DECOBA and that they had achieved a smoother transition into the TDC than their non-enculturated counterparts. They had the advantage of being *initiated* and *enculturated* prior to their entry into their faculties.

In addition to the use of evaluation forms and diaries, the analysis of the TAPs have demonstrated that fundamental concepts in the domains of economics and business studies were acquired by the neophytes. Further evidence to support enculturation was obtained from the post-enculturation stages of the research through the written recall protocols and examination results. The findings from the recall protocols demonstrate that the process of enculturation was a powerful mechanism in enabling learners to access domain-specific knowledge in their TDC. As discussed in this chapter, the written protocols of enculturated learners was qualitatively and quantitatively different compared to their non-enculturated counterparts. The examination results is also consistent with the recall protocols in that the enculturated learners performed much higher in the three examinations administrated. Overall, when enculturated learners were compared with their non-enculturated counterparts, it was found out that enculturation not only facilitated

neophytes' acquisition of domain-specific knowledge but also had significant impact upon their academic performances after they have become actual members of their TDC.

In the light of the evidence obtained from evaluation of the data, both during the enculturation as well as the post-enculturation stages of our research, it seems evident that the negative feedback (collected during the initial data collection, described in Chapter 1) received from the lecturers and the students concerning certain gaps at YADIM's programme prior to embarking upon the present research was successfully converted into the positive feedback as a result of administration of this particular research for the prospective students of only one English-medium faculty, in the context of Çukurova University, in Turkey.

On the basis of the research findings, it would then be a simplification to represent our students as coming from one distinct community, that of the community of YADIM and entering another, that of the university. Neophytes are not so much as Bizzell (1982a) imagines them, "traveller(s) to an unfamiliar country" who must learn the concepts of their discipline, they have in fact become very familiar with the new academic culture. It was found from the interview results that for the non-enculturated learners the enculturation process began after they had started the university in which the role of the university lecturers becomes one of enculturation such as "the peculiar ways of knowing, selecting, evaluating, reporting, concluding and arguing that defines the discourse community" (Bartholomae & Petrosky, 1986:12). The results obtained from various sources have shown positive signs in support of the efficiency of the enculturation process.

In conclusion, it can be argued that the present research has demonstrated that enculturation resulted in improved domain-specific knowledge, and facilitated the neophytes' transition into the TDC. It appears to have eased neophytes' transition from the language centre to the academic discourse community by helping them acquire necessary fundamental concepts of their disciplinary knowledge through English, as the medium of language through which their subject courses are taught at the TDC. Moreover, with our teaching methodology, the emphasis in knowledge acquisition has shifted from the *transmission model* to the *constructivist learning* environment, as a consequence of which it can confidently be argued that acquisition of domain-specific knowledge has taken place and neophytes have acquired fundamental concepts of their discipline on the basis of the

shared level of understanding with the expert members at DECOBA. They were also provided with an *insider experience* of a whole new way of conceptualising reality defined as the culture of a particular community. Our research findings provide evidence that knowledge acquisition has also facilitated neophytes' subsequent performance at DECOBA, as evidenced from the recall protocols and examination results.

It can be maintained that the research questions raised in Chapter 1 have been answered throughout the present investigation. With reference to the first question which asks: "How can one, in practice, go about establishing prerequisites, *sine qua non* conditions of knowledge acquisition and concept formation via L2 in a Turkish university? it can be concluded on the basis of the overall evaluation of the research findings discussed above that it has been possible to establish *sine qua non* conditions of knowledge acquisition by a process enculturation prior to neophytes becoming actual members of their TDC in the context of Turkish Higher Education. The research also demonstrated the possibility of setting up those conditions by a *researcher* who is an *English language teacher* and at the same time an *outsider* to the academic community.

With reference to the second research question which asks:
"How can one best arrange to make visible what is going on in the learners' minds?", it has also been possible to analyse cognitive processes taking place while acquiring knowledge of economics and business studies through L2, utilising TAPs. It has also been demonstrated that during the process of knowledge acquisition neophytes were aware of the conceptual growth and changes taking place in their initial knowledge base, as evidenced from the differences between uptakes (both initial and final uptakes) and what they reported to know in their initial knowledge base. Some examples produced by them in their final uptake include "before we thought inferior meant a good of low quality but now we think differently", etc. Also, it seems that these reasoning processes helped learners to reorganise their existing knowledge into new conceptual frameworks. For example, seeing the underlying relationship between the substitute teacher and substitute goods provided a new framework for conceptualising the functions of substitute goods. As a result of this all, they were highly motivated by being provided with such an experience.

Now that we have completed our investigation and evaluated the data, we can argue that enculturation has provided an efficient transformation process helping new members acquire knowledge of their discipline through L2 and led to an increased rate of success for

those who experienced it by providing many short term benefits. It can be concluded that it has been worthwhile from the perspective of neophytes to have experienced enculturation while attending YADIM. Therefore, the findings obtained from the present research offers implications for the national development of Turkey. In the short-run it has been found that learners who have experienced enculturation are more successful in their academic community in coping with the requirements that English-medium courses offer; and are better prepared in terms of what the community expects of them. It is hoped that in the long-run they will contribute to the nation's development by making contributions to international scientific communities, taking part in the economic and social activities at national and international levels, all of which requiring the use of L2.

7.5 Summary

In this chapter we have dealt with the evaluation and the discussion of the research findings from three major areas. First, findings obtained from the TAPs were discussed. Based on these findings, the present research offered an answer to the question of what acquisition is. Our conclusion is that acquisition is both a *dynamic* and an *interactive* process leading to the filling in of a gap between one's existing knowledge and the knowledge that is acquired. The research also offers a clarification to the discussion over what learning and acquisition are. It has been found that acquisition and learning are related concepts with acquisition leading to learning.

The analysis of the TAPs has shown that acquisition of domain-specific knowledge operates largely by analogical and to a certain extent metaphorical reasoning. We have found that analogies generated were in the nature of *positive, negative, between-domain and within-domain analogies* and there was a noticeable change in the type of analogies generated by neophytes during the course of the enculturation period, from *between-domain analogies* to *within-domain analogies*. Another finding is related to the parallelism between scientists and the neophytes. Our findings suggest that despite differences of age and repertory of past experience, the major common feature between the neophytes and scientists was based on the underlying processes and steps that operated in analogical reasoning. With the next finding, the contribution analogies make to knowledge acquisition has been discussed and it has been stated that analogies provide *a bridge*

between the source analogue and the target concept, a mechanism of *aid* to knowledge acquisition and leading to *meaningful learning*.

Our next crucial finding concerns the changes that occurred in the nature of strategies employed. Three stages were identified to occur along the acquisition continuum, as initial, intermediate and advanced stages and it was concluded that during the elementary stage, the use of strategies were limited to *comprehension questions, hypothesis formulation and testing, inference, evaluation and generalisation*. At the intermediate stage in the knowledge acquisition, *analogising, inference, evaluation, elaboration* mainly in relation to learners' personal knowledge, self and other repair, etc. have a proportionately larger share. However, *complementing, elaboration* with domain-specific knowledge increased with the advancement of learning, which implies that individuals are not much in need of negotiation for meaning and they can contribute to the discussion with their domain-specific knowledge.

It has been pointed out that concordances have many benefits such as providing empirical data, yet it was revealed that a span of 4 words on either side of *the seed* provide extremely limited information, particularly in the case of highly complex and abstract concepts.

The next area investigated was the analysis and discussion of the written recall protocols and examination results. The analysis of protocols showed that enculturated learners in all proficiency groups scored higher qualitatively at macro and micro levels compared with their non-enculturated counterparts. At the level of qualitative analysis, there were noticeable differences between the two groups in that enculturated learners were able to make elaborations by relating the new knowledge to their prior domain-specific schemata and frames, making comments and interpretations consistent with the original text. In the case of learners with no prior domain-specific knowledge structures, making interpretations were mostly inconsistent with the original text resulting in many instances of distortions. The results show that readers with prior domain-specific scemata and frames accurately recall more than those less familiar with the text content. Examination results indicated that our teaching methodology improved academic performance of the enculturated learners over the non-enculturated ones and prepared them to cope more efficiently with the demands of their academic community.

The final research finding is related to the feedback obtained by means of evaluation forms and diaries reflecting neophytes' experiences concerning the enculturation studies. Findings from these research devices have demonstrated that enculturation has eased their transition from the language centre to the academic discourse community by helping them acquire fundamental concepts of their disciplinary knowledge through English. The final outcome of enculturation was that it provided a bridge between the two communities - YADIM and DECOBA.

While this chapter has been devoted to discussing and evaluating the research findings based on the evidence obtained from multiple sources, the next chapter is concerned with concluding the research and suggesting its implications for future studies.

CHAPTER EIGHT
CONCLUSION and IMPLICATIONS FOR FUTURE RESEARCH

8.0 Introduction

In the introduction of this thesis, it is stated that the major motivation for this study is to investigate knowledge acquisition and concept formation of the new members in a specific domain, economics and business studies, through English while they receive a language training programme prior to their entry into their TDC. In this final chapter, our aim is to summarise the research carried out in response to the research questions addressed in Chapter 1. It is also aimed to state the conclusions drawn from the investigation and evaluate the extent to which the hypotheses stated at the outset of the research have been supported by the research findings. Theoretical and pedagogical implications of the study are given. The original contribution the research offers to the academic discipline is explained and future areas of research are suggested.

This study has described the acquisition of domain-specific knowledge from the very initial to the very final stage of development, within a specific discipline, through English, by a process of enculturation, in Turkish Higher Education. It focused on neophytes at a point when they were preparing for entry into their professional community existing beyond the immediate environment of the language centre, YADIM. Our aim was to provide answers to the following questions with the objective of producing a framework which can fairly comprehensively account for the major processes leading to acquisition of domain-specific knowledge and concept formation.

-To initiate the knowledge acquisition process,
-To observe and explain the process of knowledge acquisition through L2 in a specific domain,
-As a result, to determine the feasibility of offering such an approach as a model to be implemented at language schools facing similar situations.

The present research utilised multiple data collection methods. The main source of data was collected through the TAPs in an attempt to discover the underlying cognitive processes leading to knowledge acquisition and concept formation. In addition, written recall protocols were utilised in order to determine the product of what was acquired and, all other methods, such as examinations, questionnaires and diaries were utilised as contributory devices, each contributed to determining of knowledge acquisition from cognitive as well as affective aspects. The research was designed and implemented on a two-stage model to enculturate the students of a particular discipline. Prior to commencing the actual investigation, a preliminary needs assessment was conducted in order to discover the problems creating difficulties for the first year undergraduate students at DECOBA by administering questionnaires and conducting interviews. The findings from the initial needs assessment provided the motivation for the present investigation. A specialist corpus was created based on the written genres of economics and business texts utilising computer facilities which supplied *the seeds* as input of knowledge to be offered during the knowledge acquisition process. The first stage of the actual study involved setting up an enculturation process while the neophytes were receiving the language training at the foreign language centre of the university. This process was conducted partly here and partly at the TDC. The final stage involved monitoring the neophytes' performances at DECOBA and making a comparison with those of their non-enculturated counterparts.

The enculturation process was planned in such a way that studies at YADIM and DECOBA could be integrated, as illustrated in the enculturation model, Chapter 5/ Figure 5.8. The first part of the enculturation involved setting up a community of neophytes at YADIM, orienting them to the programme. Neophytes were then taken as a whole class to DECOBA to get to know their community, where they were introduced to the lecturers as well as the first year undergraduates. At the language centre, they were introduced gradually to concordance citations of the key words to initiate knowledge acquisition and concept formation. At the same time, regular visits were paid to the TDC attending lectures delivered in English. The enculturation which lasted for the whole academic year was monitored after the neophytes became members of their academic community. The research was implemented with 21 prospective students of DECOBA attending YADIM.

8.1 Supporting Research Hypotheses

The three hypotheses reformulated in Chapter 4 are listed below:
It is hypothesised that when neophytes are given a concept embedded in co-text which is identified on the basis of the corpus, it will trigger an association of schemata, frames and scripts in their mind, which will eventually contribute to building up a mental picture in relation to knowledge of their specific domain.

This hypothesis has been partly confirmed. The analysis of TAPs has shown that during the earlier stages of knowledge acquisition *between-domain analogies* were generated as in the case of *inferior goods* and *substitute goods*, when neophytes lacked domain-specific knowledge and were in the process of building up knowledge of their discipline. However, as they started to accumulate more knowledge of their domain they started drawing analogies within the target domain itself, as in *retailer* and they used within-domain analogies more frequently than between-domain analogies. This corresponded to the advanced stage along the acquisition continuum.

The second hypothesis is related to how to get them to feel *the sense of community,* that is, the circumstances under which knowledge acquisition can be established. It is hypothesised that acquisition of domain-specific knowledge and concept formation can only take place within a community of learners with shared interest and purpose and thus certain conditions need to be established for acquiring domain-specific knowledge. If these conditions are satisfied, in other words, if a community of learners can be established sharing the same interest and purpose, we will expect to see a successful learning programme with regard to knowledge acquisition and concept formation, for neophytes who are as yet outside members of their community.

This hypothesis was justified when a community of neophytes was established, as a *replica community,* all of whom were the prospective members of DECOBA with shared interests and purposes, as described in Chapter 5. Our research demonstrated that forming such a community was essential for setting up the enculturation process. They had high motivation since they were aware that the kind of programme they were provided with was what they needed for their efficient functioning in their TDC. On the other hand, non-enculturated learners with no experience of enculturation, demonstrated the opposite results.

The final hypothesis is related to observing this growth. It is hypothesised that neophytes, being outsiders to their TDC, will initially start with a general frame of reference, that is, every day knowledge, due to their unfamiliarity with domain-specific knowledge. With repeated exposure to input, their frame of reference will be consistent with those of the expert members of the TDC.

This hypothesis was also proved. TAPs, when supported with retrospective data in the form of asking neophytes to report what they had learned from their discussion, proved very effective in observing this growth. Neophytes when exposed to input of *seeds* interpreted it against their background knowledge which was in the nature of general world knowledge. During the initial stages to knowledge acquisition, there was a good deal of explicit negotiation amongst the neophytes in reaching consensus in the knowledge acquisition process. However, with more discussion among the group members, this general knowledge was gradually replaced with domain-specific knowledge and consequently they were able to reach the shared level of knowledge of the expert members. In addition, during the intermediate and advanced stages, there was a decrease in explicit negotiation for meaning with more contribution made by the neophytes.

In the hypothetical model to knowledge acquisition, as demonstrated in Chapter 3/Figure 3.7.2, it was hypothesised that as the size of the shared frame of reference increases relative to the size of a non-shared frame among neophytes, the degree of explicit communication for meaning will decrease and more contribution will be made by them with the knowledge of their specific discipline. It was also assumed that the process of collaboration would lead to a situation where the neophytes have acquired shared meanings and shared definitions, thus acquiring similar cognitive developments with respect to the expert members of the TDC. This hypothesis has been fully validated by the findings of the present study. As demonstrated by the debates throughout Chapter 6, domain-specific knowledge was continually constructed as neophytes became exposed to more input and were involved in the discussion. Since the knowledge base was changing, the degree of overlap between the individual knowledge base and the knowledge of the TDC members eventually overlapped.

The section below deals with the implications of the research, which will be approached from two major perspectives; theoretical implications and its pedagogical implications.

8.2 Theoretical Implications of the Research

The major theoretical implications our research offers in relation to the mental processes taking place during knowledge acquisition and concept formation, are offered below:

In Section 1.2, concept formation was likened to the growth and development of a plant from microscopic and macroscopic aspects. It was also stated that the question of how this growth takes place largely remains unanswered. Our research therefore offers important implications to *language and knowledge acquisition theories* by tracing from the very initial to the very final stage of development how this growth occurs in adults' acquiring domain-specific knowledge through L2. Our findings demonstrate that acquisition process involves some sort of change in the human organism and thus results in an organic growth and development, as in the plant analogy. It is an organic and a biological growth in that the initial knowledge base continuously goes through some kind of change which involves assimilation of new knowledge into information already possessed. Described within the cognitive information processing framework, knowledge acquisition is a gradual change from the existing mental representation to domain-specific representation of knowledge.

The analyses of the TAPs have revealed three categories of processes taking place in neophytes while acquiring domain-specific knowledge, as *accretion, tuning and restructuring* leading to changes in the knowledge base. *Accretion* involved adding new information to the existing schema by a process of matching (see debates on *scarcity, monopoly and retailer*). Following the accretion stage, two modes of learning processes took place; *tuning* or *restructuring*. In the case of *tuning*, the existing schema went through a process of refinement and evolution to accommodate a domain specific frame of reference (see debates on substitute goods and fiscal). The third type of change taking place in the existing schema is related to *restructuring* by which the schema experienced either *weak restructuring*, which involved the creation of new relations between existing concepts as in the case of inferior goods or *radical restructuring* which involved a fundamental change in the schema, as with debate on *specialisation*, similar to a paradigm shift in the history of science. Taking into account the

processes and products involved in knowledge acquisition, it can be pointed out that the ability to acquire domain-specific knowledge requires an ability to construct a mental representation of a concept through various reasoning processes. In other words, acquisition of domain-specific knowledge, which in this case is the knowledge of economics and business studies, involves building up a mental representation, which is a copy of knowledge structures of the target discipline.

8.3 Pedagogical Implications

Our research offers its pedagogical implications at three levels: The first pedagogical implications will be offered to the state concerning the language policy in ELT teaching in Higher Education in Turkey. The second pedagogical implications is addressed to the language schools and YADIM and finally to teachers and classroom situations.

Implications for the Present Language Policy in Turkey

Language policy has a direct effect on foreign language education in a particular country and should therefore be considered as a crucial factor in planning the teaching programmes. It is true that in a developing nation like Turkey there is a need for Turkish scientists to consult written publications in their field of specialism in order to be informed of and better equipped with the latest developments, which, however, are mainly available in English. This raises the crucial question of whether English-medium instruction at universities should become an ultimate solution for the accessibility of recent developments. Is it the only solution? If not, what alternatives could be proposed so that the nation can continue with its development through a medium of instruction at higher education in L1 but use L2 as a source of access in order to enrich the native culture. Two alternative views will be proposed concerning the current language policy in Turkey based on the research findings:

The first proposal concerns the Turkish government's decision to make L2 instruction *optional*. It was stated in Chapter 2 that although when originally proposed English-medium programmes at some faculties in Çukurova University were compulsory. But since we began to apply our research the social situation has changed, and English is now no longer compulsory but optional. Our original motivation for carrying out this research was that all

students of the English-medium departments have to be proficient and knowledgeable in acquiring concepts of their disciplines to follow their academic courses, which is not entirely the case any more. However, the present research findings demonstrated convincingly that this point need no longer be the case and that the policy makers can go back to the original policy proposed and change the language policy from being *optional* to *compulsory*, as originally proposed. According to the argument which maintains that there is still a need for English to be a medium of instruction, then the present research has shown how the existing problems could be overcome by systematically organising the programme of the language centres so that knowledge acquisition and concept formation through L2 could be facilitated.

The second argument is related to the use of L1 as the medium of instruction at the university level. In many countries of the world, it can be seen that English language is not a rule but an exception so the question to raise would be "why carry out the university education through the medium of English?". It is also stated in the regulation by the YÖK that "in Higher Education, the language of instruction is Turkish". The results of the present investigation have pointed to the possibility of acquiring scientific knowledge through L1. The analyses of the TAPs have demonstrated that neophytes were able to acquire domain-specific knowledge not only in English but in Turkish, as well, as evidenced from the code-switching when neophytes were moving back and forth between the two languages.

In addition, the establishment of universities is a highly costly enterprise, particularly English-medium ones. The interview and questionnaire results with the non-enculturated economics students (see Chapter 1) pointed out that accessing L2 was not always a pleasant experience. In view of this fact, the proposal made by the current research is to keep the mother tongue as the medium of instruction but offer subject specific courses throughout the four year university education, as a separate subject, that is, as an *ancillary* course alongside the subject specific courses taught through the native language so that the university students can access the written English sources to enrich their existing knowledge. Thus, the advice offered by the current research would be to convert the English-medium instruction into the mother tongue, but access information via L2 as an ancillary course so that due to the national development, the future scientists and economists are not deprived of the recent scientific and technical developments published through English. The study designed and implemented by Kirkgöz

(1990) for the students of the Department of Agricultural Economics alongside their university training, produced successful results.

Implications for the Language Schools and YADIM

There has been a growing concern and interest in the problem of how to help future members of different academic communities attending the language schools acquire scientific knowledge of their related domains. The present study has proved that it is possible to realise this objective by systematically planning the enculturation process. Chapter 2 raised the question of what an idealised language centre is and suggested the possibility of integrating the *General Systems Theory* into the educational system. Taking into account this particular theory, research findings bring a new outlook for the general policy of the language centres. The general framework established during the present research shows that language centres can operate on the basis of the *General Systems Theory*, which argues for an institution to be an open system interacting with its environment, that is, the TDCs. For this purpose, a collaborative effort is needed between the language schools and the members of the discourse communities.

It is suggested that curriculum design of language schools needs to be based on more empirical foundations by carrying out systematic needs assessment, with each faculty member constituting a different community of learners. Since in the present study the use of computer facilities has been found particularly beneficial in identifying empirically and objectively the concepts of one's discipline, it is recommended that they be utilised for this purpose. Besides, language schools must offer their students specifically the experience of acquiring domain-specific knowledge as well as the opportunity of visiting lectures for furthering their experiences, prior to being actual members of their community by planning an *enculturation* process.

It was argued concerning the social background of Turkey that one main shortcoming of the language schools is that they remain a separate part of the community for which they provide the service. Our research findings provide implications for the current curriculum and syllabus design of language courses, by means of an enculturation model, to operate more

efficiently. Our research has demonstrated that in the absence of such a preparation, the expectation and needs of the TDC cannot adequately be met. The research has also demonstrated that the attainment of such goals as laid down in the promulgation can only be achieved when the prerequisite conditions for knowledge acquisition are provided at the language centres.

The implications described above for the language schools apply to the language programme at YADIM, as well. In the light of the findings, an *enculturation process* can be devised for the prospective students of all English-medium departments attending the language centre. In view of the benefits of utilising computer facilities, it is recommended that different corpora be created based on the written texts of different domains so that the future members of different disciplines can be familiarised with the fundamental concepts of their discipline prior to their becoming initiated into their faculties. However, it has already been stated in connection with corpus creation that the concordance programme used for the present research provided only 4 words on either side of the key word, which led to difficulties for neophytes in working out the meaning of certain concepts. Thus, it is suggested that a more sophisticated programme be used for this purpose which will supply more information, thus facilitating knowledge acquisition.

Implications for Language Classrooms and Teachers

Another educational implication of the research points towards a clear explication of the nature of language in science classes. Many scientific terms are an integral part of our everyday language but have different sets of linguistic functions and meanings with collocates in a particular discipline. It is suggested that in language classrooms making students aware of the shared understanding would help them talk in consistent terms with the expert members of the TDC. Research results obtained from this study indicate that, while attending the language classes, learners should be given the opportunity of acquiring fundamental concepts of their future disciplines through L2. It seems hard to expect students to make sense of advanced domain related topics when their conceptualisation of fundamentals of their disciplines may still be quite inappropriate after they have become members of their TDC. As demonstrated by the present study, familiarisation with basic concepts of one's academic discipline seems to be an ideal foundation for students to encounter in the first year of the university.

Since the research findings proved that a constructivist learning environment has accelerated acquisition of knowledge via L2, teachers are recommended to provide such a learning environment in the classroom in which learners can evaluate, criticise and explain their own conceptions through social-cognitive classroom interactions in acquiring domain-specific knowledge. It is only then that the effort to attend the language course will be a worthwhile experience. Given the benefits of analogical reasoning to knowledge acquisition and concept formation, it is suggested that teachers should encourage their students to analogise on the basis of their existing knowledge while acquiring abstract and complex scientific concepts. Similarly, teachers themselves can introduce helpful analogies to students during the process of acquiring complex concepts not only in L2, but also in L1.

8.4 Original Contribution of the Study

In the literature on corpus studies, the question of how knowledge of a discipline can be acquired through the use of concordances has not been investigated, yet. Although the importance of corpora was recognised by Johns (1992), Willis (1990) and many others and various studies were set up in identifying lexical needs of learners (Garranda, 1993; Barry, 1993; Kırkgoz, 1993), the investigation involving how the knowledge acquisition process operates and the learners' responses to collocations have remained unexplored research subjects. The present research therefore makes a significant contribution to this particular area of how acquisition of domain-specific knowledge and concept formation occur using only concordance lines as a source of *input* and learners' responses to this process.

In Section 3.3, it is stated that in the philosophy of science, the nature of processes through which conceptual change is brought about and the way adults acquire concepts of a particular discipline through a foreign language remain an unexplored research area. The present research potentially makes an original contribution to language and knowledge acquisition theories by examining closely and systematically the processes involved when adults acquire domain-specific knowledge through L2 at a time when they are not expert members of their TDC. We have discovered that knowledge acquisition operates on the basis of analogical reasoning. Our research thus makes a contribution to discovering the ways in which adults construct analogies while acquiring knowledge of a particular discipline, the types and the

changing nature of analogies employed and the contribution that activated analogies make to knowledge acquisition and concept formation.

During the analogical reasoning process, we discovered that the steps identified by Holyoak & Thagard (1995) were followed by the neophytes with one addition, i.e. the step judging the relevance of the analogy, as illustrated in Chapter 7/ Figure 7.1, that is, *the relevance strategy* is activated when an analogy produced by a group member is questioned by other students in the group as to its relevance to the economics domain. With this particular step, the research offers an additional step to the principles of analogical reasoning.

8.5 Scope for Future Research

Clearly, the extent to which these findings apply to the entire language school depends on the extent to which one can generalise from the sample investigated. However, there can be little doubt that the study proved the possibility of setting up and implementing an enculturation process which facilitated knowledge acquisition and concept formation through L2 in one specific scientific domain.

While one particular department was selected for the research presented here, it must be stressed that the nature of the research and its findings and implications go far beyond this particular context to situations where similar needs exist. Based on this research, several major areas for future research are suggested

Firstly, on the basis of the research model developed in this study, future research needs to be conducted to enculturate prospective students of other English-medium discourse communities in the context of Çukurova University. In the face of increasing popularity of the English-medium universities where the students are expected to acquire professional knowledge of their specialism through L2, the present research offers a model of how learners' academic needs can be taken into account and how they can be provided with *sine qua non* conditions of knowledge acquisition while undertaking the language programme. Drawing on the findings of the present study, the enculturation model devised here can be tested on learners in other English-medium universities in Turkey, in other countries and in different cultures facing the

same situation. Similar steps could be followed or adopted with the aim of verifying our findings.

Our findings bring about another question: "What kind of strategies are employed by adult students with no prior knowledge of their domain and specialising in domains other than economics and business studies while acquiring knowledge of their discipline through L2?" Future research is suggested in this specific area also, in order to find out whether or not students specialising in other domains also employ the same strategies as those identified in our research. The purpose of such study would be to provide a comparison between distinct domains.

The final area of future research we suggest concerns knowledge acquisition strategies of different groups of learners. Although the research questions stated in Section 1.3 have been answered throughout this study, our research poses new hypotheses which concern identifying cognitive processes and strategies of different groups of learners. It is hypothesised that students with prior domain-specific knowledge would employ different reasoning strategies from those of the neophytes while acquiring specific knowledge of their domain via L2. It would therefore be highly interesting to conduct future research with students of different discourse communities who have already acquired knowledge of their specific discipline through L1 by receiving a university education but need to acquire knowledge of their domain through L2. Such a research would allow a comparative study to be made between the processing strategies of neophytes in our research, and those who are already knowledgeable in their discipline in L1, yet need to acquire concepts of their discipline through L2.

We believe that the suggested topics for future research above will lead to new avenues to open up regarding acquisition of knowledge and concept formation. Such studies would undoubtedly also contribute greatly to language and knowledge acquisition theories by providing ways through which the acquisition process could be facilitated.

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APPENDIX I

THE STUDENT QUESTIONNAIRE

Dear Students,

The purpose of this questionnaire is to identify the difficulties you encounter and the strategies you use while reading the specialist texts in English. The questionnaire also aims to discover the amount of time you spend on reading and how frequently you read your textbooks and various articles. The questionnaire is in 4 sections and it forms an important part of my research. The results obtained from the questionnaire will contribute to optimising the Academic Reading Programme in YADIM in order to make it more relevant to academic needs of future economics students in YADIM.

It is therefore important for you to take your time and mark only one of the choices (X) for each question which is most suitable for you.

Thank you for your contribution

Yasemin Kırkgöz
Eng. Language Instructor

SECTION I

How do you rate yourself in the following areas?

	excellent	very good	good	poor
	( )	( )	( )	( )
1. In your opinion how good is your comprehension of economics and business texts in English?				
2. How well do you see yourself in remembering what you have read?				
3. How well can you apply your existing background knowledge in understanding specialist text you read?				
4. How well are you able to relate the general meanings of familiar words used in their specialist meanings?				
5. How well do you see yourself in interpreting the related concepts in your specialism?				
6. How well do you see yourself in note taking from specialist texts?				
7. How would you rate your ability to quickly extract relevant information from specialist texts?				

SECTION II

While reading books and articles in your areas how often do you use the following strategies?

	always (4)	often (3)	sometimes (2)	never (1)
1. Scanning the specialist texts to extract the specific information				
2. Skimming the text to obtain general information				
3. Guessing the text content from title, subtitles and the illustrations				
4. Guessing the meaning of unknown words from context				
5. Note-taking from the written texts				
6. Interpreting the charts, tables and illustrations				
7. Making critical and evaluative comments about the text(s) you have read?				

SECTION III

While reading the specialist texts and articles, how successful are you in the following areas?

1. What is your understanding of reading?
a. I can understand everything I read
b. I can understand most of what I read (with a dictionary)
c. I can understand half of what I read
d. I can understand only a few words when I read

2. How do you cope with the meanings of unknown words?
a. I use clues in the texts
b. I associate them with the words I already knew
c. I look them up in a dictionary
d. I ignore them completely

3. How well can you interpret the meaning of familiar words used in economics?
a I can understand accurately the meaning of all the new words
b. I can understand accurately most of the new words
c. I can understand accurately half of the new words
d. I can understand accurately only a few of the meanings of new words

4. How do you read economics texts?
a. I read the complete texts
b. I read only the sections which I feel are important for me
c. I read the sections emphasised by the lecturers in the lectures
d. I read the sections which I can understand

5. When do you read specialist texts and articles recommended by lecturers?
a. I read them regularly, everyday, following each lecture
b. I read them before the examinations
c. I read them when I have to prepare assignments
d. I hardly ever read them .

SECTION IV

The purpose of this section is to determine whether you have the recommended textbooks, which written materials you read while preparing for assignments and examinations and the amount of time you allocate for each of them.

1. Do you have the textbook recommended for the Economics and Business Administration?
Economics Yes ( ) No ( ) Business Administration Yes ( ) No ( )

2. What do you use to prepare for your examinations and projects? Please indicate in percentages (%) which written texts you read while preparing for examinations or your assignments and how much time you allocate to choices provided (the answers must add up to 100%.

%( ) notes %( ) workbook %( ) fellow students %( )books %( ) articles

APPENDIX II

THE LECTURER QUESTIONNAIRE

The purpose of the questionnaire is to determine what your expectations of the students are in both written assignments and examinations in the Business Administration and Economics subjects which are taught in English. Only the first year students are included in the scope of this questionnaire. This questionnaire forms an important part of my PhD research I am carrying out in YADIM on the subject of "Academic Reading Programme".

I would like to thank you for taking your time to answer the questionnaire.

Instructor. Yasemin KIRKGÖZ

1. What do you assess in the students' assignments and examinations? Please put the choices given in order of importance.

( ) factual knowledge (definitions)
( ) understanding of concepts
( ) problem solving skills
( ) interpreting diagrams, tables, etc.
( ) critical evaluation of knowledge
( ) other(s) please specify

2. To what extent are your examination questions based on the following materials? Please indicate in terms of percentages (%).

( )	( )	( )	( )	( )
textbook	article	workbook	lecture notes	other

3. If the recommended English textbook is given 100 points in terms of vocabulary and complex structures, what percentage can you give to vocabulary and structure you use in your own lectures? For this question please consider 1 class hour as 100% of the time.

( )	( )	( )	( )	( )
0-20 %	21-40%	41-60%	61-80%	81-100%

4. This question is in two sections:

a. Do you ever have to give the Turkish explanations in your lectures?

often ( ) sometimes ( ) seldom ( ) always ( )

b. If so, how much time do you spend on them in a particular lecture? What percentage of time in and average class is given over to explaining items of vocabulary and concepts in Turkish. (Please give percentages).

( )	( )	( )	( )	( )
0-10 %	11-30%	31-60%	61-80%	81-100%

APPENDIX III

SAMPLE CONCORDANCE OUTPUT

COMPARATIVE

country must have a comparative advantage in at least
the gardener has a comparative advantage in gardening. When
the lawyer has a comparative advantage in law; the
United States has a comparative advantage in wheat production,
which they have a comparative advantage, or produce relatively
from international trade. But comparative advantage provides a general
from specialization to exchange: comparative advantage and economies of
Japan has shifted its comparative advantage Today it specializes
While Ricardo's theory of comparative advantage dates back to
enunciated the principle of comparative advantage in the early
in law. concept of comparative advantage is related to
more detailed analysis of comparative advantage to the chapter
demonstrates the law of comparative advantage. The law of
after spending Illustration of comparative advantage.Assumptions: 1. In 1
of industries simply reflected comparative production costs, undistorted by
for using that resource comparative advantage Nations ability to
it must exploit that comparative advantage, regardless of another
the gardener has the comparative advantage in gardening. To
opportunity cost has the comparative advantage in that good
the gardener has the comparative advantage in gardening. To
the lawyer has the comparative advantage in law. She
opportunity cost has the comparative advantage in that good
opportunity cost has the comparative advantage in that good
lawyer stick to their comparative advantage, both gain from

APPENDIX IV

A Sample TAP on *Scarce*

The following debate on *scarce* illustrates how neophytes who started with *no initial knowledge base* were able to acquire *full initial uptake* following the TAP. Moreover, the same group members were able to expand on the initial uptake after being exposed to more textual information.

Bahadır Sena, Ayse discussing "scarce"

S: could scarce mean shortage or limited?	***CompQ.***
B: I'm not sure yes I think so look it says limited here .	***attends to more elements**
A. Diamond is an expensive jewellery is not it	***CompQ.***
B. Yes that's right	***Rep.***
A: Diamonds are limited they are scarce then	***Complem* synonym**
S: yes the resources are limited and therefore consumers should be encouraged to use them very carefully	
A: For example they should not waste them	***Complem***
B: So scarce is limited land is scarce because it is found in limited amount in nature	***Genel.***

From no initial knowledge base to full initial uptake: *Scarce goods are the things that can not be found in every case. They are limited, so they should be used carefully. Some of the scarce goods include diamond, land, gold, etc. Because they are limited, government raise their prices. For this reason, goods that can not be found easily are wanted which seem scarce and their prices rise. To find scarce goods which we need takes a lot of time.*

Final uptake of the above group: *Human beings have a lot of wants and these are so infinite. They want better food, better housing, better transport, health and education. This leads to the basic economic problem which is the problem that the world's resources are scarce but human wants are infinite. We cannot provide the scarce resources that we have consumed so there is a word "scarce" and "scarcity". And finally scarcity is an effective concept in economy.*

APPENDIX V

A Sample TAP on *domestic*

The following debate illustrates the knowledge acquisiton process of a group of neopytes who started with some initial knowledge base and acquired full uptake

Initial knowledge base: *Domestic means pets but we think that domestic can also be used for other subjects such as it may be related with economy, money and so on.*

Veli, Cem and Sena discussing domestic

S: here consumers are buying domestic goods	***CompQ.***
C: But what is domestic goods there is also domestic economy and products	***attends to more elements**
V: I'm not sure yes I think so look it says limited here	***Complem.***
S: that is right could domestic mean something to do with home I mean home-made.. so consumers are buying home made goods I mean domestic goods..	***Rep.***
V: If domestic means home made then domestic goods are produced in our country	***Complem.***
C: We can say that domestic refers to everything produced in Turkey	***Genel.***

From the pet frame to full uptake:

"In addition to domestic animals, we learned that domestic can also be used with goods, people, economy, companies. For example, domestic citizens are Americans, Europeans, Australians, etc. These people live especially within their countries. Domestic companies have an effect on economy by manufacturing goods, for example some domestic companies in our country include Sabanci, Eczacibasi, Koc etc.(these refer to Turkish companies). Domestic economy is the economy of a nation".

APPENDIX VI

Sample Uptakes on *Inferior goods*

This appendix shows the initial and final uptake of the group members that started their debate with no knowledge base on the concept *inferior goods*.

From no knowledge base to initial uptake:

"*Inferior goods are second hand goods, for example, you have an old washing machine and you want to buy a new one. For this reason, you want to sell it to another person. We can say that inferior goods are the goods that are sold cheaply as they are used before*".

Yet, this general knowledge acquired from debate was modified having seen the concept in a larger context, through a process of tuning, in which partially instantiated slots were filled, as in the output below:

Final uptake of the above group:

"Inferior goods are the goods that satisfy our demand, if we cannot afford to buy the goods which we need, we can buy a second-hand good, which is an example of an inferior good. We can say that second hand good is an example of an inferior good. You prefer to buy these goods because of your income or other financial reasons. For example, if our income was more we would prefer to travel by plane to bus. In this example, bus is an inferior good".

APPENDIX VII

A sample Debate on *substitutes*

needs or desires are **substitutes**. Other examples are tea
rule about complements and **substitutes**: If two goods are
corn and soybeans are **substitutes** in production: They can
whether two products are **substitutes** or complements is their
as items can be **substitutes** or complements in consumption
identical or are close **substitutes**, and the outputs are
and oranges). similarly, **substitutes** in production are goods
We saw earlier that **substitutes** in consumption are goods

Hakan, Fatih and Orçun debating *substitutes*

H: I think needs and requirements are substitute
F: there are rules about substitutes they are raw materials
O: could substitute mean needs o::r requirements
H: it gives tea example here and in the production corn and soybeans are substitutes
O: the two products ..they are two products
F: In that case substitute means needs and requirements .

***Reasoning**
Analogy
CompQ.

***attends to more elements**
Genel.

Full initial uptake:

"Substitutes are the things which people need or desire. If two goods are needs or desires they are substitutes. For example, tea, corn and soybeans are substitutes in production".

APPENDIX VIII

Debates held at the Advanced Stage
Debates on *Unemployed, Tax, Wholesaler* and *Promotion*

These debates illustrate less negotiation for meaning and more input by the learners.

Debate on *unemployed*

less anxious about being **unemployed**
as a result of being **unemployed**
even to register as **unemployed**, and are now coming
they prefer to be **unemployed**. Does this mean that
less anxious about being **unemployed** and are thus willing
People are either **unemployed** or out of the
when the economy has **unemployed** resources that could be
mental burden on the **unemployed** worker. High unemployment leads

Zeliha, Sena, and Tugbay discussing *unemployed*

S **unemployment** is a serious problem	*Reasoning
T:-yes, you're unemployed when you're out of work..unemployment should be taken seriously because it would lead to **social and economic problems**	***Elab.* based on personal experience**
Z: unemployment would lead to a drop in **production and export**	***Elab.* domain know.**
S: well.. according to me the lines describe the result of unemployment.. yes let's talk about it	***Personal elab.**
T: according to me people migrate from villages to the cities so	***Elab.* with reasons**
Z: so as a result of this they may get unemployed	**Complem.*
S: one minute.. he can't find a job in the village and so migrates to a big city	
Z: What about if he can't find a job?	**CompQ*
T: now, that's how unemployment goes up... I've even read it in the newspaper. Istanbul and Izmir municiples have made a proposal that visa be applied to stop migration to big cities. To me this is a very important idea. Cities like Aksaray, Kastamonu and Zonguldak are suffering from the lack of population growth.. Because of this, they think that population migration should be diverted to those cities. To me, this is a very important subject. This could be a solution towards solving the unemployment problem.. It could be a remedy to another sore. But, that isn't a definite solution	***Elab.* offer solution to unemployment problem in Turkey** **Various elements of a scene**
Z: unemployed were unemployed.	

When the resources in the economy are insufficient the number of people who work or are employed tend to be fewer and this is leading to an unemployment. I think it asks on this line what would happen iff a person is unemployed? He would have financial difficulties, of course *Elab.

T: and **the mental burden..**yes burde::n.. well it's I think another problem.. *Infer.

Z: so the unemployed person is always preoccupied with the idea of getting a job *Reply/ infer.

S: and this creates a **mental burden** on him.. *Genel.

Debate on *tax*

rather than direct **tax.** Tax revenue is necessary
of indirect **tax.** higher tax rates increase the value
saying that a **tax** on cars reduces the
in this case a **tax** on cigarettes, may be
Although the personal income **tax** is assesed on individual
that each individula's average **tax** rate, the proportion of
an income tax, a **tax** on wages, the labour
revenue is value added **tax** (VAT), which is effectively

Zehra, Ebru Nacide discussing tax:

E: rather than direct **tax.** of indirect **tax.** higher tax rates increase the value there is direct and indirect taxes. One is the tax taken from another person and the other is the tax we pay on the goods and services we buy.	**Infer*
Z: revenue is value added **tax** (VAT), VAT is a general tax levied against the goods and services..	**Elab.*
N: that a **tax** on cars well…there are also taxes paid on the cars..	**Complem.*
E: they are indirect taxes..	**Complem.*
Z: Also there is the income tax which is paid according to the income of each individual.. This is a direct tax.	**Elab.*
Yes, and when you work out the average amount, you get the average tax..	**Confirm*
E: the taxes paid remain to the state and provide the development of the nation..	**Complem.*
Z: taxes.. that is.. there is income tax and indirect taxes... to the nation's economy or else directly to the nation's..	**Elab.*
E: takes we pay are making contribution.. this will return as hospitals, schools and roads involvement	**Elab.*
Z: there is also tax evaders..They show that there income is low and thus pay less amount of tax	**Complem.*
E: It is the state that decide on the types of taxes and the taxes are collected according to the rules..	**Eval.*
Z: yes, in theory	**Confirm.*
E: We have litter tax. that is a recent one.. Don't forget to get your receipt after your shopping..	**Complem*
Z: and as the nation develops and as its needs increase there is a variety in the taxes. For example, that litter tax is an unncessary thing.. despite this it is necessary for the development of our economy more concious and critical about economics situation	**Relates it to the current tax system in Turkey*
E: If your income is high, the amount of tax you pay tends to be high and vice versa..	**Elab. with domain specific knowledge*

Debate on *wholesalers*

In the debate on *wholesaler* there is hardly any negotiation for meaning, yet there is a growing input coming from the learners and a growing tendency to draw upon growing domain specific knowledge and less on personal experience.

wholesalers. because **wholesalers** seldom deal directly with
organizational buyers. Some merchant **wholesalers** provide a vide variety
wholesalers and retailers. **wholesalers** sell primarily to retailers
producers and **wholesalers** or wholesalers and retailers.

Wholesalers: Cenk, Tugbay and Sena discussing

C: Now, we have moved on to **the wholesaler**.first of all they're a kind of seller	***Reasoning**
T: and also they sell goods in whole I mean in whole quantity.. wholesalers. because **wholesalers** seldom deal directly with they buy goods from the producers and sell them to the retailers.	****Elab.***
S: that's right..wholesalers have the goods in large quantities, for instance at least one box of goods. They also put price on top of the price they buy from the producers.	****Complem.* with next line**
T: Yes, but this varies according to the type of good. For example, in the case of one lemon, you can't market it as a box, never mind..	****Confirm***
C: they need to have wharehouses. They need to keep the goods they buy from the producers in large stores, because these goods will reach the producers after being stored there for a while.	****Elab.***
S: Yes, they store the goods first and then offer them for sale. When the quantity of a good decreases in the market they offer more of the good to the market..	****Confirm***
T: there should be a relationship between **producers and wholesalers** otherwise we would have poor quality goods	****Genel.***

Debate on *Promotion*

The following debate on *promotion* is also a frame-based discussion, in which neophytes started with what promotion as a word means. Under the broad promotion frame, types of promotion are discussed, as illustrated below:

two basic categories: consumer **promotion** and trade promotion.
product, price, distribution and **promotion**. Promotion is perhaps the
packaging, distribution, pricing and **promotion.** A classic mistake is
the right kind of **promotion** to change his company's
the forth element of **promotion**, slaes promotion covers a
the money spent on **promotion** could be put to
the advertising and sales **promotion** activities to reach a
and TV programme. Sales **promotion** is the final element

Ebru, Zeliha and Sena discussing *Promotion*

Z: so promotion is advertising something..	***Hypothesis sets in immediately**
E: So the promotion has two categories one is the consumer and the other trade promotion one is made for the purpose of trade and the other for the consumers	****Infer.* triggered by "categories"**
Z: and consumer promotion aims at influencing the consumers in addition there is trade pomotion	****Complem.* with further *Infer.***
S: so the advertisements have several functions like packaging, pricing and distribution	****Complem*/ advertisement sub-frame**
Z: here it says advertisement. have an important role it influences its products price and distribution	***Attend to more information**
S: For example TV advertisements have a big effect in our shopping we tend to buy what we see on TV	****Elab.***
Z: yes companies make more profit if they do the right kind of advertisements	****Confirm***
E: How many elements did we discuss before?	****CompQ.***
S: two what is the third one?	****Rep.***
Z: consumer? sales promotion and trade promotion.	****Complem.***
E: but there are three	****Complem***
S: If you make a good advertisement you have a benefit..	****Elab.***
E: TV programmes are a form of advertisement and when a good is put on market and presented to the consumers I think this is the sales promotion	***The last concordance line contains two frames, both of which are attended to by learners**
Z: the other point is that advertisement encourages materials among people	****Complem.***

Initial knowledge base of the above group: Promotion means for example, we have commodities or goods and we want to sell. We want to increase the rate of sale and provide some opportunities to the consumers. For example, the seller of an air conditioner might say if you buy an air conditioner, we will offer you a new hi-fi set in return. This is the promotion".

From some knowledge base to full initial uptake: "We can separate promotion into two groups; consumer promotion and trade promotion. In the consumer promotion the seller gives some presents, if the consumer buys something the seller gives her another good.

APPENDIX IX

A Sample Debate on *purchase*

The following debate illustrates the use of various strategies, including repair, comprehension question, confimation, etc. At initial stages each line of the concordance list was either discussed separately, or integrated into learners' debate after having a thorough look over the concordance lines. One significant feature in the discussions is that of the personifying feature whereby learners related information derived from input to their personal experiences using "we" in most instances.

as a busines person, you **purchase** airline tickets so that
as a consumer, you **purchase** airline ticket to visit.
which buyers want to **purchase** depend on the prices
which people want to **purchase** also depends on other
willing and able to **purchase** at various market prices
strong influence in the **purchase** decision. People buy the
about each customers needs, **purchase** habits, and so on
commodity the consumer must **purchase** a quantity such that
rather, the optimal **purchase** rule tells us that

Nacide, Ayse and Hakan discussing *purchase*

A: **purchase?** Well it means .. **to buy** ?	**CompQ.*
N: Well.. let's see..as a consumer you purchase airline tickets what can you do with the airline ticket then..ou buy it look it says on this line which buyers want to purchase depend on the prices	**attending to clues to "buyer"*
H: **prices** so:oo **you buy something**	**Infer*
A: as a businessmen you purchase airline ticket yes it means buy something. Isn't it Nacide?	**CompQ.*
N:Yes I think so **you purchase an airline ticket** so it must mean buy **people must buy goods** and things like that	**Confirm.*
A:to visit places, they buy their tickets from an airline I mean a business man it's a kind of shopping an:d the same is true for the consumers.	**Confirm./ Complem.*
H:consumer must purchase something yes people buy what they need. An ordinary citizen comes and buys what he needs from the supermarket and a businessman goes and buys a plane ticket and--	**Elab* /**Purchase triggers shopping script**
N:or he buys a plane ticket when he visits	**Complem*
H: What is more, the **customers**, sorry I mean the **consumers** have to benefit from the producers. We use money to buy goods and services	**S-Rep.*
A: What we buy changes from person to person.. Also the consumers.. things..the prices.. the prices of goods	*Elab.* **with world knowledge**

affects what we buy and what people want to buy also depends on other things

N: yes..When shopping, the first important thing is the price. If the good in the market is attractive, well-advertised people can buy it whether they need or not. But the attractiveness of the good is very important. For example, I know from myself, I buy unnecessary items, why? First out of necessity and later on...

***Elab.* price frame**

N: Do you know what **influence** is?

*CompQ

H: // **effect something**//

*Rep.

A: Does it really mean to effect?

*CompQ

N: Certainly..

*Confirm

H: strong influence in the purchase decision. Okay let's add the brand, as well. Especially young people give importance to brand. If there is demand for a good, its price'll increase In addition, **demand and supply are important,** for example, the quality of the good is important. If a good is well presented and well advertised people tend to buy it.

***Elab.* in stages drawing upon her personal brand script to project additional meaning**

N: there is also the **purchase rule**

***Attending to next line**

Hakan: the optimal purchase rule tells us that well...there're various ways of doing shopping you can see the good you want to buy from your house by teletex catalogue or broshure. you can order it and pay by check or postcard and in this way you can do your shopping. but this method is a bit expensive so most people generally prefer normal shopping.

***Hakan elaborates purchase rule in stages drawing upon his personal script which contains very specific detail**

N: but a great majority generally use cheque or credit cards

*Eval.

APPENDIX X

Cultural Reflections

This appendix illustrates a debate in which reference is made to the cultural differences between the *home* culture and *the culture of other countries*, as reflected in the concordance lines.

individual benefit and social **benefit**. For an individual unemployment
are entitled to supplementary **benefit** if their total income
payments such as supplementary **benefit**, but also the consumption
Costs in working. Unemployment **benefit**, and subsidies up private
the unemployed get unemployment **benefit**. In particular, for given
the average weekly **benefit** check to unemployed workers

Cem, Sena and Burcak discussing *benefit*

C. **benefit means a kind of profit..**	***Explains**
S: we:ll individual and **social benefit** ..**social benefit...**	****Complem***
B: we can't get the meaning from here..	
S: well everybody gets some kind of social benefit in Turkey such as a child benefit, I mean it's an extra money a **supplementary benefit** that government pays, don't you know that	****Elab. analogy***
C: **I see the unemployed gets unemployment benefit.. Unemployment benefit**. uhmm	***Reasoning**
S: unemployed. here unemployment benefit is the money paid to people....	***CFR**
B: yes but not to everybody..	***Cultural awareness**
S: Certainly only to those who are out of work..	****Confirm***
C: as a kind of insurance..	
B: haa, that is a kind of contribution to people then..but I belive that generally is is given in **developed countries** like England and people there get **unemployment benefit**.	****Complem***
S: Unemployed... from the government gets unemployment benefit... yes but we do not have this in Turkey	***CFR**

APPENDIX XI

SAMPLE WRITTEN RECALL PROTOCOLS

Appendix XI-a. Sample Elaborations

This section of the appendix contains some sample elaborations which are based on the following text "Barter versus monetary exchange".

Original text: **Barter versus monetary exchange**

Money is so much a part of our day-to-day existence that we are likely to take it for granted, failing to appreciate all that it accomplishes. The most obvious way to trade commodities is not by using money, but by barter -a system in which people exchange one good directly for another. And the best way to appreciate what monetary exchange accomplishes is to imagine a world without it. Under a system of direct barter, if Farmer Jones grows corn and has a craving for peanuts, he has to find a peanut farmer, say, Farmer Jones, with a taste for corn. If he finds such a person (this was called the *double coincidence* of wants by the classical economists), they make the trade. If this sounds easy, try to imagine how busy farmer Jones would be if he had to repeat the sequence for every commodity he consumed in a week. For the most part, the desired double coincidences of wants by the classical economists are more likely to turn out to be double wants of coincidence, where Jones gets no peanuts and Smith gets no corn. Worse yet, with so much time spent for looking trading patterns, Jones would have far less time to grow corn. Thus money makes the whole economy more productive.

Sample elaborations of student's recall protocols in the EG based on the above text:

The following excerpts from student protocols are reproduced without alteration, apart from a few corrections of spelling errors. The underlined sections refer to elaborations.

Excerpt 1: "Barter is a medium of trade. There can be several kinds of barter. But we know barter as exchanging goods with goods. I believe that monetary exchange is also a kind of barter. Because we are exchanging money with goods. We use money as a medium of trade. For instance farmer A produced corn but he needs beans. He has to find another farmer who has produced beans. And they must agree in barter to exchange their goods. It is very relativist event. Because maybe farmer A can't find another farmer in exact time. In monetary exchange system, people use money for goods when they need goods and they trade goods for money when they sell something. But they don't trade for goods directly for other goods".

Excerpt 2: The following is "elaboration" by one mid-proficiency learner from the EG on the concept of "double coincidence" by providing a coherent interpretation of a text:

"Barter is a system of exchanging things between two people. This exchange is called double coincidence of wants. Barter was used in past while money did not appear. For instance, two farmers were using barter system. One is producing corn the other peanut. The first has too much corn which is not needed and the other has too peanut so they must exchange it because the first needs peanut and the second corn. When their desires are the same they can use barter. But if you cannot find a person who needs corn then what will they do? At first it seems easy to exchange goods. But it is not easy to find the correct person. If we cannot find the person to exchange this becomes a double wants of coincidence. Now monetary exchange is the alternative for barter system. It is very easy compared with to barter system".

APPENDIX XI-b

Sample Distortions

The following samples are taken from the students in the non-enculturated group in which underlined parts refer to distortion, based on the text *barter versus monetary exchange*.

a) The following is a type of distortion which results from *the lexical misinterpretation.*
"Barter is a kind of selling and buying system. We can say barter means money's granted". (But, in the original text, it says "but we can take it for granted"... the reader seems to be tackling with the local level of difficulties).

b) The following protocol illustrates *distortions* resulting from misunderstanding the concept *double coincidence* in the original text.

"Double barter (exchange) takes more time for the farmers. For example, one wants to exchange peanuts the other corn. First they must find each other. Before selling the things it can be spoiled, so it is expensive and difficult to keep the goods without spoiling. But you can keep money or gold easily".

Though this reader seems to have a general understanding of the text, he misinterprets the notion of *double coincidence*.

c) Another example of distortion was seen when non-enculturated learners attempted to bring their own interpretation which was inconsistent with the textual information thus ended up in distorted output. The sample below belongs to a mid-proficiency student in this group. Underlined ideas illustrate the student's attempt to elaborate which is in contradiction with the notion of *barter.*

"From a very long time money is known as the most important thing in our life. But before money was found people were using a system that known as barter that is the trade of goods with the other good. In that century barter is getting a very big place in the economies because there is very big difference between the value of the different countries money. And with the barter system people are paying less tax to government. And they can use the goods that are not useful for them to be a different good".

Though the concept of tax appears in the above protocol, tax is not mentioned in the original text. Student's attempt to elaborate causes distortion.

APPENDIX XI -c

Sample Reconstructions

The following sample belongs to a mid proficiency learner in the EG on the text *barter versus monetary exchange*, illustrating reconstruction of the text.

"When money did not exist, people used barter for getting whatever they want and for commerce. For example, when you need bread, you have to give whatever the person who has the bread needs. Another example, a farmer changes his product with another farmer's product. Farmer X produces apples and he needs some peas. Farmer Y produces peas and if he needs apples they can change their products. In barter system people were changing their goods according to their needs. Till now everything seems to be allright, but what can they do if they need other goods? Farmer Y may need garlics and he can't find anyone who wants to change his garlics with corn. It is very difficult to find person for your needs. It takes too much time.

People used barter system years ago. Then they found or we can say money existed. Using money is too easy. This new system is called monetary exchange. In this system you do not have to find a person who wants to change his goods. You can buy everything you need with money. To carry money is very easy. It is durable, storable, uniform. Money is also a medium of exchange To sum up money is more useful than barter".

Another example to reconstructed ideas from the other texts include:

Original information: "International trade occurs because no single country has the resources to produce everything well".

Recall protocol: "The countries are making trade according to goods which they can produce best" is the reconstructed statement.

APPENDIX XII

THE EVALUATION FORM

The purpose of this form is to ask you to evaluate this year's study. Please write clearly your opinion to the questions below:

1. Did you find the studies we have been carrying out until now useful?

- --Yes ---No

2. If your answer is "yes" please write briefly your opinion on our studies.

3. During the course of these studies which aspect/s have you found most useful?
   Put the following items in order of importance.
   -- My knowledge of vocabulary has increased
   -- I learned new concepts
   -- I learned new subjects in my future field of study
   -- Please indicate if there are other areas you have found particularly useful

4. Write two of the most important problems you have encountered during our studies in YADIM.

5. Write down your opinion on the lectures you have attended in the Faculty of Economics and Business Administration.

6. In what ways did you find these lectures useful?

7. How do you evaluate yourself in understanding the lectures?
   -- I understood the entire lecture
   -- I understood most of it
   -- I understood half of it
   -- I could not understand anything, at all.

8. To what extent did the studies we have carried out at YADIM help you to understand the texts you have read in your specialist field?

9. At the moment how do you evaluate yourself in comprehending the texts you read in your specialist field?

10. What further recommendation can you make for the future state of this programme?

Thank you for your co-operation
Instructor Yasemin Kırkgöz

APPENDIX XIII

Sample Answers From the Examinations

Question 2 from the second examination given at DECOBA.

Question: A recent psychiatric study found that there is a positive correlation (relation) between the amount of time children and youth spend watching television and mental depression. Speculate on (discuss) possible cause-effect relationships.

Answer of an enculturated learner:

When we think widely, we can see that there is a relationship between the amount of time children and youth spend watching and mental depression. It is true that if you watch too much TV you become ill. Your headaches and you become too tired. To watch TV is good for children because they can learn things from TV: As it has advantages it has also disadvantages. There are some programmes which are very harmful for children. These programmes are fighting and guns. When the children watch these films they want to do the same things that they saw. That makes mental depression. It is helpful if the children watch the programmes which are suitable for their mind and age. It is like an atom if you use it is a good way, it is very helpful for scientists and people, but if you use it in a bad way it harms people.

Answer of an non-enculturated learner:

Children watching television. But they are watching everything not only the cartoons. For example action films or fighting films. They can't decide what is good or bad. They want to be a boy that they see on TV. It is very dangerous for them. Parents must be very careful about this fact.

APPENDIX XIV

The Recycling Effect

This appendix illustrates the effect of recycling on the acquisition of knowledge. In the following debate on "money", learners recalled what they had acquired on the debate "barter" bringing the previously acquired knowledge to bear on the current debate. The recalled information is shown by 'italic letters'.

Excerpt on money

in an economy with **money**. Because exchange is so
a barter system, no **money** is used. One example
goods, services, resources and **money** payment in a simple
with very high real **money** balances we have plenty
short, cigarettes became the **money** of the POW camp
barter and exchange for **money**. In a barter system
hundreds of participants. **Money** also solves the problem

Levent, Koray and Sadik

S: in an economy with money. Because exchange is so What is the meaning of this idea? well after money has entered our life, exchange through barter has disappeared and shopping became much easier.	**transferring domain specific knowledge on barter*
K: When shopping was done without money various items were used instead of money	**Elab.*
L: *before the existence of money there was barter system, I mean a form of exchange system.* It was difficult to do shopping, then. *After barter system has disappeared and money came in use shopping has become much easier.*	**transfer previous concept of "barter" discussing advantage& disadvantages*
S: In the present economy, we pay money for *the goods, services* we buy... In the near future even money will disappear and we will use credit cards for our payments and ____	**Elab.relating to present economic situation*
L:___in our day, paper money and coins are being used.	**Complem.*
S: the value of demand for real money increase continuously. We use real money more frequently. Here it talks about money equilibrium balances. Rich become richer and poor become poorer. It talks about money balances in our economy.	**Elaborate it with current economic situation in Turkey*
L: Money is loosing its value in due course because of inflation.	**Complem.*

Following is another example. The underlined lines refer to citing the concordance lines, whereas the italic prints indicate references made by the students to previously debated concept of barter.

"a barter system, no money is used. One good"..
Nacide: Before money was used in the economy people experienced difficulties in the barter system. money is useless in a barter system because money wasn't invented then.
Zehra: what were the difficulties? We had to give even the things that we liked best instead of money. What else let me think..For example, you can carry money but can't carry big items.
Ebru: *because barter was inconvenient I mean let's say you had some eggs but you needed a pair of shoes so you had to find somebody and he also should need egg*
Naz: and also so *impractical.* I mean there's always problems with buying and selling within bartering system. I mean barter system depends on exchanging one good with another.

Recyclical effect on *wholesaler and retailer*

Retailer, a previously debated concept, when collocated with wholesaler helped neophytes recall and integrate it into their discussion, as in this extract:

Wholesalers distribute the goods at whole quantities, rather than one by one. They sell the goods to the retailers and the retailers sell them to the customers with some profit. Retailers on the other hand buy the goods from the wholesalers.

Recyclical effect on *capital*

The extract below illustrates the initial uptake of one of the groups, following their debate on *capital.* Although the debate is related to *capital*, neophytes have drawn upon what they had acquired from their previous debates on the concept *scarcity*. The underlined parts indicate recalling and integrating the previous knowledge.

Capital is the amount of money which we use to set up new work or investment. Natural resources are limited but humans have unlimited wants, so entrepreneurs must establish new factories. What they need to establish the factory is called capital".

APPENDIX XV

Helpful concordance lines

This appendix displays concordance lines, which were found particularly helpful by the neophytes during the acquisition of domain-specific knowledge. The key words are shown in bold print, while the helpful words are indicated by underlining.

Modifiers: These are adjectives which either immediately precede or follow the key word or are sometimes found on the same concordance line. They give clues as to the characteristics of the concept.
under the convertible **bond**, has the choice of
various kinds of fixed **assets**, only land does not
whether other interest-bearing **assets** are risky, people will
monetary system. Because **barter** is so inefficient
however, **barter** is inconvenient and impractical
farmer wants. Furthermore, with **barter** there's a problem

Discourse markers: Discourse markers such as "like, such as, in contrast to", found on the same concordance lines are particularly important clues
it's with other **complements**, such as tennis racket
bonds consist of most financial **assets** such as common stocks
have to sell personal **assets**, like your family's home
trade markers are not physical **assets** like chairs or desks
or bank deposits. Such **assets** are important. The holders
Retailers. In contrast to **wholesalers**
in contrast to **wholesalers**, retailers are a visible element

Descriptive lines: Some lines have descriptive properties, describing some characteristics of the key word. The fact that 'diamond' occured on the same line as 'scarce' and carrying the semantic meaning that diamond is expensive thus cannot be commonly found was an important clue to get the meaning of 'scarce'. The last line on GNP is part of the description of how to work out GNP.
diamonds are naturally **scarce**
building and lorries are **capital** because they can be
telecom companies are **capital** intensive utilities
working population is the **labour** force plus those
in process known as collective **bargaining**. together, union and management
real GNP divides real **GNP** by the population growth. It
advice: encourages consumers to use **scarce** goods carefully

Frame-related words: Some word(s) groups appear on the same concordance line and form part of the same frame.
compared with **bonds.** An interest payment to a bondholder as interest **rates** rise, banks normally If profits are low, **share** prices will be low interest rates cause **bond** prices to change at the end. Collective **bargaining** and strikes. The process Door-to-door **Retailer**. a door-to-door retailer relies straightforward relationship between **bond** prices and interest rates

Abbreviation: Abbreviated concepts with their explanations are the most important clues for what these concepts stand for, as shown in the box.
GNP (Gross National Product) revenue is **value added tax** (VAT) which is effectively **gross national product** (GNP). the dollar value of **gross national product**(real GNP) measures the total income

Dates/time references: Dates and time references provided clues
ends on december 3. **fiscal** year any 12 consecutive (usually a year). **GNP** excludes profits from foreign-owned

APPENDIX XVI

Limitations of Concordances

This appendix illustrates limitations of concordances by means of the initial uptake of neophytes on the concepts *perfect and imperfect competition.* Concordances did not provide much knowledge thus leading to *no-uptake*.

For an economist, perfect competition is a market with many buyers and many sellers, with no single buyer or seller having any (noticeable) influence over price. That is, every buyer and every seller is a price taker. Imperfect competition exists when any buyer or any seller is able to influence the price (Wonnacott & Wonnacott, 1986:54-55).

imperfect competition exists. Imperfect **competition** exists when any buyer
can influence price, imperfect **competition** exists. Imperfect competition exists
can influence price, imperfect **competition** exists. when any buyer
perfect **competition** is the result of
imperfect competition and perfect **competition** is a kind of

The initial uptake of most neophytes in relation to perfect competition was
"a process in which firms or the owners of the factors of production offer products for sale in the same market to the customer".

However, this initial knowledge went through modifications as shown by the following uptake which is collected after the neophytes were provided with a larger context.

"perfect competition means prices are determined and you obey these prices while you compete. Imperfect competition is determined by buyers. If demand increases imperfect competition occurs (interpreted by us). In Perfect competition there is an average price of goods. This competition includes a lot of buyers and sellers. In imperfect competition, prices are not determined because any sellers and buyers can influence the prices of goods".

Below is the uptake of another group:

I want to explain perfect competition with an example. For example, the price of wheat is determined by a farmer and a consumer. Because wheat is not a monopoly good. So, not only the seller but also the consumer decides the price of wheat. This is perfect competition. In the imperfect competition the price of goods is influenced directly by seller. e.g. IBM is an important firm in a computer market and they produce new computers every year. Then IBM decides the price so this time only the firm influences the price. For example, Microsoft is invented by Bill Gates so the producer of Microsoft decides the price. the price is determined by personal forces in the imperfectly competitive market.